



## DEPARTMENT OF ENERGY

### 10 CFR Part 431

[EERE-2022-BT-STD-0008]

RIN 1904-AF32

**Energy Conservation Program: Energy Conservation Standards for Air Cooled, Three-Phase, Small Commercial Air Conditioners and Heat Pumps with a Cooling Capacity of Less than 65,000 Btu/h and Air-Cooled, Three-Phase, Variable Refrigerant Flow Air Conditioners and Heat Pumps with a Cooling Capacity of Less than 65,000 Btu/h.**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Final rule.

**SUMMARY:** In this final rule, the U.S. Department of Energy (DOE or the Department) is adopting amended energy conservation standards for air cooled, three-phase, small commercial air conditioners and heat pumps with a cooling capacity of less than 65,000 Btu/h and air-cooled, three-phase, variable refrigerant flow air conditioners and heat pumps with a cooling capacity of less than 65,000 Btu/h that rely on new efficiency metrics and align with amended efficiency levels in the industry standard. For the relevant equipment classes, DOE has determined that it lacks clear and convincing evidence required by the statute to adopt standards more stringent than the levels specified in the industry standard.

**DATES:** The effective date of this rule is [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Compliance with the amended standards established for air cooled, three-phase, small commercial air conditioners and heat pumps with a cooling capacity of less than 65,000 Btu/h and air-cooled, three-phase,

variable refrigerant flow air conditioners and heat pumps with a cooling capacity of less than 65,000 Btu/h in this final rule is required on and after January 1, 2025.

**ADDRESSES:** The docket for this rulemaking, which includes *Federal Register* notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at [www.regulations.gov](http://www.regulations.gov). All documents in the docket are listed in the [www.regulations.gov](http://www.regulations.gov) index. However, not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure.

The docket webpage can be found at [www.regulations.gov/docket/EERE-2022-BT-STD-0008](http://www.regulations.gov/docket/EERE-2022-BT-STD-0008). The docket webpage contains instructions on how to access all documents, including public comments, in the docket.

For further information on how to review the docket, contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by email:

[ApplianceStandardsQuestions@ee.doe.gov](mailto:ApplianceStandardsQuestions@ee.doe.gov).

**FOR FURTHER INFORMATION CONTACT:**

Ms. Catherine Rivest, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-7335. Email: [ApplianceStandardsQuestions@ee.doe.gov](mailto:ApplianceStandardsQuestions@ee.doe.gov).

Ms. Kristin Koernig, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-3593. Email: [kristin.koernig@hq.doe.gov](mailto:kristin.koernig@hq.doe.gov).

**SUPPLEMENTARY INFORMATION:**

**Table of Contents**

- I. Synopsis of the Final Rule
- II. Introduction
  - A. Authority
  - B. Background

1. Current Standards
  2. ASHRAE 90.1
  3. September 2020 NODA/RFI
  4. March 2022 NOPR
- III. Discussion of Crosswalk Analysis
- A. Crosswalk Background
  - B. Crosswalk Methodology
    1. Three-phase, Less than 65,000 Btu/h, Single-package and Split-system ACUACs and ACUHPs
    2. Three-phase, Less than 65,000 Btu/h, Space-Constrained and Small-Duct, High-Velocity ACUACs and ACUHPs
      - a. Space-Constrained Equipment
      - b. Small-Duct, High-Velocity Equipment
    3. Three-phase, Less than 65,000 Btu/h VRF
  - C. Crosswalk Results
- IV. Estimates of Potential Energy Savings
- V. Conclusions
- A. More Stringent Efficiency Levels
  - B. Review Under Six Year Lookback
  - C. Definitions for Space-Constrained and Small-Duct, High-Velocity Equipment
  - D. Energy Conservation Standards
    1. Standard Levels
    2. Compliance Date
- VI. Procedural Issues and Regulatory Review
- A. Review Under Executive Orders 12866 and 13563
  - B. Review Under the Regulatory Flexibility Act
    1. Description of Reasons Why Action Is Being Considered
    2. Objectives of, and Legal Basis for, Rule
    3. Description on Estimated Number of Small Entities Regulated
    4. Description and Estimate of Compliance Requirements Including Differences in Cost, if Any, for Different Groups of Small Entities
    5. Duplication, Overlap, and Conflict with Other Rules and Regulations
    6. Significant Alternatives to the Rule
  - C. Review Under the Paperwork Reduction Act
  - D. Review Under the National Environmental Policy Act of 1969
  - E. Review Under Executive Order 13132
  - F. Review Under Executive Order 12988
  - G. Review Under the Unfunded Mandates Reform Act of 1995
  - H. Review Under the Treasury and General Government Appropriations Act, 1999
  - I. Review Under Executive Order 12630
  - J. Review Under the Treasury and General Government Appropriations Act, 2001
  - K. Review Under Executive Order 13211
  - L. Information Quality
  - M. Congressional Notification
- VII. Approval of the Office of the Secretary

## I. Synopsis of the Final Rule

The Energy Policy and Conservation Act, Pub. L. 94-163, as amended,<sup>1</sup> authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. (42 U.S.C. 6291–6317) Title III, Part C of EPCA<sup>2</sup> established the Energy Conservation Program for Certain Industrial Equipment. (42 U.S.C. 6311-6317) Such equipment includes air cooled, three-phase, small commercial air conditioners and heat pumps (ACUACs and ACUHPs) with a cooling capacity of less than 65,000 Btu/h (three-phase, less than 65,000 Btu/h ACUACs and ACUHPs) and air-cooled, three-phase, variable refrigerant flow (VRF) air conditioners and heat pumps with a cooling capacity of less than 65,000 Btu/h (three-phase, less than 65,000 Btu/h VRF), the subject of this rulemaking.

Pursuant to EPCA, DOE is required to consider amending the energy efficiency standards for certain types of covered commercial and industrial equipment, including the equipment at issue in this document, whenever the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) amends the standard levels or design requirements prescribed in ASHRAE 90.1, “*Energy Standard for Buildings Except Low-Rise Residential Buildings*,” (ASHRAE 90.1), and, at a minimum, every 6 years. (42 U.S.C. 6313(a)(6)(A)-(C)) For each type of equipment, EPCA directs that if ASHRAE 90.1 is amended, DOE must adopt amended energy conservation standards at the new efficiency level in ASHRAE 90.1, unless clear and convincing evidence supports a determination that adoption of a more-stringent efficiency level would produce significant additional energy savings and be technologically feasible and economically justified (42 U.S.C. 6313(a)(6)(A)(ii) (referred to as the ASHRAE trigger)) If DOE

---

<sup>1</sup> All references to EPCA in this document refer to the statute as amended through the Energy Act of 2020, Pub. L. 116-260 (Dec. 27, 2020), which reflect the last statutory amendments that impact Parts A and A-1 of EPCA.

<sup>2</sup> For editorial reasons, upon codification in the U.S. Code, Part C was re-designated Part A-1.

adopts an amended uniform national standard at the efficiency level specified in the amended ASHRAE 90.1, DOE must establish such standard no later than 18 months after publication of the amended industry standard. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) If DOE determines that a more-stringent standard is appropriate under the statutory criteria, DOE must establish such a more-stringent standard no later than 30 months after publication of the revised ASHRAE 90.1. (42 U.S.C. 6313(a)(6)(B)(i))

Under EPCA, DOE must also review its energy conservation standards for three-phase, less than 65,000 Btu/h ACUAC, ACUHP, and VRF equipment every six years and either: (1) issue a notice of determination that the standards do not need to be amended, as adoption of a more-stringent level under the relevant statutory criteria is not supported by clear and convincing evidence; or (2) issue a notice of proposed rulemaking including new proposed standards based on certain criteria and procedures in subparagraph (B).<sup>3</sup> (42 U.S.C. 6313(a)(6)(C)(i))

ASHRAE officially released the 2019 version of Standard 90.1 (ASHRAE 90.1-2019) in October 2019, thereby triggering DOE's previously referenced obligations, pursuant to EPCA, to determine, for certain classes of three-phase, less than 65,000 Btu/h ACUAC, ACUHP, and VRF equipment, whether: (1) the amended industry standard should be adopted; or (2) clear and convincing evidence exists to justify more-stringent standard levels. For any classes where DOE was not triggered by ASHRAE 90.1-2019, the Department routinely considers those classes under EPCA's six-year-lookback provision at the same time to address the subject equipment in a comprehensive fashion.

---

<sup>3</sup> In relevant part, subparagraph (B) specifies that: (1) in making a determination of economic justification, DOE must consider, to the maximum extent practicable, the benefits and burdens of an amended standard based on the seven criteria described in EPCA; (2) DOE may not prescribe any standard that increases the energy use or decreases the energy efficiency of a covered equipment; and (3) DOE may not prescribe an amended standard that interested persons have established by a preponderance of evidence is likely to result in the unavailability in the United States of any product type (or class) of performance characteristics (including reliability, features, sizes, capacities, and volumes) that are substantially the same as those generally available in the United States. (42 U.S.C. 6313(a)(6)(B)(ii)-(iii))

The Federal test procedures for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF were most recently amended in a test procedure (TP) final rule published on December 16, 2022 (December 2022 Three-Phase TP final rule) and are currently prescribed at Title 10 of the Code of Federal Regulations (CFR) part 431, subpart F, appendix F1 (appendix F1). 87 FR 77298. The December 2022 Three-Phase TP final rule established amended test procedures for these equipment in appendix F1 and moved the test procedures referenced by the current Federal energy conservation standards into a new appendix at 10 CFR part 431, subpart F, appendix F (appendix F). The amended test procedures in appendix F1 reference American National Standards Institute (ANSI)/Air-Conditioning, Heating, and Refrigeration Institute (AHRI) 210/240, “*2023 Standard for Performance Rating of Unitary Air-conditioning & Air-source Heat Pump Equipment*” (AHRI 210/240-2023) and ANSI/ASHRAE Standard 37-2009, “*Methods of Testing for Rating Electrically Driven Unitary Air-Conditioning and Heat Pump Equipment*” (ANSI/ASHRAE 37-2009) for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF. For three-phase, less than 65,000 Btu/h ACUACs and ACUHPs, the test procedure in appendix F references ANSI/AHRI Standard 210/240-2008, “*Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment*,” approved by ANSI on October 27, 2011, and updated by Addendum 1 in June 2011 and Addendum 2 in March 2012 (AHRI 210/240-2008). For three-phase, less than 65,000 Btu/h VRF, the test procedure in appendix F references ANSI/AHRI 1230-2010, “*2010 Standard for Performance Rating of Variable Refrigerant Flow (VRF) Multi-Split Air-Conditioning and Heat Pump Equipment*,” approved August 2, 2010 and updated by Addendum 1 in March 2011 (AHRI 1230-2010).

As set forth in ASHRAE 90.1-2019, the efficiency levels for three-phase, less than 65,000 Btu/h ACUAC, ACUHP, and VRF equipment are specified in terms of

seasonal energy efficiency ratio-2 (SEER2) for cooling mode and heating seasonal performance factor-2 (HSPF2) for heating mode. These efficiency levels are measured per AHRI 210/240-2023. Furthermore, ASHRAE 90.1-2019 and AHRI 210/240-2023 align the test procedures for three-phase, less than 65,000 Btu/h equipment with those of their single-phase counterparts (*i.e.*, measuring performance in terms of SEER2 and HSPF2), which, aside from the three-phase power supply, are otherwise identical.<sup>4</sup>

DOE published a notice of proposed rulemaking (NPR) proposing amended energy conservation standards for three-phase, less than 65,000 Btu/h ACUAC, ACUHP, and VRF equipment in the *Federal Register* on March 30, 2022. 87 FR 18290 (March 2022 NPR). In the time between the publications of the March 2022 NPR and this final rule, ASHRAE officially released the 2022 version of Standard 90.1 (ASHRAE 90.1-2022) in January 2023, which updated the standard levels for three-phase, less than 65,000 Btu/h VRF. In the March 2022 NPR, DOE requested comment on its proposal to adopt the more stringent efficiency levels for three-phase, less than 65,000 Btu/h VRF presented in the first public review draft of Addendum ‘ay’ to ASHRAE 90.1-2019, should such levels be incorporated into an updated version of ASHRAE 90.1 that publishes prior to DOE publishing this final rule. *Id.* at 87 FR 18304. As discussed in section V.A of this document, this proposal was supported by stakeholders. Accordingly, DOE is adopting more stringent efficiency level standards in this final rule for three-phase, less than 65,000 Btu/h VRF to align with the amended levels in the updated 2022 version of ASHRAE 90.1, ASHRAE 90.1-2022.

DOE is also adopting definitions for space-constrained (S-C) commercial package air conditioning and heating equipment (S-C ACUACs and ACUHPs) and for small-duct, high-velocity (SDHV) commercial package air conditioning and heating equipment

---

<sup>4</sup> See, *e.g.*, 80 FR 42614, 42622 (July 17, 2015), 83 FR 49501, 49504 (Oct. 2, 2018), and 87 FR 77298, 77300.

(SDHV ACUACs and ACUHPs), as described in section V.D of this document.

Additionally, DOE is separating equipment classes and corresponding energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs that are (1) S-C split-system ACUACs; (2) S-C split-system ACUHPs; (3) S-C single-package ACUACs; (4) S-C single-package ACUHPs; (5) SDHV ACUACs; and (6) SDHV ACUHPs. These additional equipment classes for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs are included in both ASHRAE 90.1-2019 and ASHRAE 90.1-2022.

As described in detail in section III of this document, DOE conducted a crosswalk analysis to translate the current SEER and HSPF standards (measured per the test procedures outlined in appendix F) to SEER2 and HSPF2 levels, respectively (measured per the latest version of AHRI Standard AHRI 210/240 (*i.e.*, AHRI 210/240-2023)). DOE then compared these crosswalked metrics to those presented in ASHRAE 90.1-2019 to determine which equipment classes are triggered by the increased stringency in ASHRAE 90.1-2019.

In this document, DOE is updating the minimum energy conservation standard levels found at Tables 3, 4, and 13 of 10 CFR 431.97. The amended standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF, which are expressed in SEER2 and HSPF2, are presented in Table I.1 and Table I.2.<sup>5</sup> The standards in Table I.1 apply to all three-phase, less than 65,000 Btu/h ACUACs and ACUHPs manufactured in or imported into the United States starting January 1, 2025. The standards in Table I.2 apply to all three-phase, less than 65,000 Btu/h VRF manufactured in or imported into the United States starting January 1, 2025.

---

<sup>5</sup> Energy conservation standards for air-cooled, three-phase, small, commercial packaged air conditioners and heat pumps with a cooling capacity of greater than 65,000 Btu/h and air-cooled, VRF, multi-split systems with a cooling capacity of greater than 65,000 Btu/h are not addressed in this final rule. This equipment will instead be addressed in separate energy conservation standards rulemakings.



As described in section V of this document, DOE has determined that insufficient data are available to determine, based on clear and convincing evidence, that more-stringent standards would result in significant additional energy savings and be technologically feasible and economically justified. The clear and convincing threshold is a heightened standard, and would only be met where the Secretary of Energy (Secretary) has an abiding conviction, based on available facts, data, and DOE's own analyses, that it is highly probable an amended standard would result in a significant additional amount of energy savings, and is technologically feasible and economically justified. *See American Public Gas Association v. U.S. Dep't of Energy*, No. 20-1068, 2022 WL 151923, at \*4 (D.C. Cir. January 18, 2022) (citing *Colorado v. New Mexico*, 467 U.S. 310, 316, 104 S.Ct. 2433, 81 L.Ed.2d 247 (1984)).

DOE normally performs multiple in-depth analyses to determine whether there is clear and convincing evidence to support more stringent energy conservation standards (*i.e.*, whether more stringent standards would produce significant additional conservation of energy and be technologically feasible and economically justified). However, as discussed in the section V of this final rule, due to the lack of available market and performance data, DOE could not conduct the analysis necessary to evaluate the potential energy savings or evaluate whether more stringent standards would be technologically feasible or economically justifiable, with sufficient certainty. As such, DOE is not adopting standards at levels more stringent than those specified in ASHRAE Standard 90.1. Rather, DOE is adopting the levels specified in ASHRAE 90.1-2019 for three-phase, less than 65,000 Btu/h ACUAC and ACUHP equipment as well as the levels specified in ASHRAE 90.1-2022 for three-phase, less than 65,000 Btu/h VRF, as required by EPCA, except for S-C ACUACs and ACUHPs and SDHV ACUACs and ACUHPs, for which DOE is adopting crosswalked levels that maintain equivalent

stringency to the currently applicable Federal standards but do not align with the levels in ASHRAE 90.1-2019.

For S-C ACUACs and ACUHPs and SDHV ACUACs and ACUHPs, DOE has concluded that the levels specified in ASHRAE 90.1-2019 are less stringent than the applicable current Federal standards. Therefore, to avoid backsliding (as required by EPCA),<sup>6</sup> DOE is adopting standards for S-C ACUACs and ACUHPs and SDHV ACUACs and ACUHPs in terms of SEER2 and HSPF2 that maintain equivalent stringency as that in the applicable current Federal standards (in terms of SEER and HSPF) for that equipment.

The adopted standards, which are expressed in SEER2 and HSPF2, are shown in Table I.1 and Table I.2, and apply to all products manufactured in, or imported into, the United States starting on January 1, 2025.

**Table I.1 Energy Conservation Standards for Air-Cooled, Three-Phase, Small Commercial Package Air Conditioners and Heat Pumps with a Cooling Capacity of Less Than 65,000 Btu/h (Compliance Starting January 1, 2025)**

Equipment Type	Size Category (Cooling)	Subcategory	Minimum Efficiency
Air Conditioners	< 65,000 Btu/h	Split System	13.4 SEER2
		Single-Package	13.4 SEER2
Heat Pumps	< 65,000 Btu/h	Split System	14.3 SEER2 7.5 HSPF2
		Single-Package	13.4 SEER2 6.7 HSPF2
Space-Constrained Air Conditioners	≤ 30,000 Btu/h	Split System	12.7 SEER2 <sup>1</sup>
		Single-Package	13.9 SEER2
Space-Constrained Heat Pumps	≤ 30,000 Btu/h	Split System	13.9 SEER2 7.0 HSPF2
		Single-Package	13.9 SEER2 6.7 HSPF2
Small-Duct, High-Velocity Air Conditioners	< 65,000 Btu/h	Split System	13.0 SEER2
Small-Duct, High-Velocity Heat Pumps	< 65,000 Btu/h	Split System	14.0 SEER2 6.9 HSPF2

<sup>1</sup> In the March 2022 NOPR, DOE produced a typographical error in “Table I-1” that suggested a proposed energy conservation standard of 13.9 SEER2 for S-C, split-system ACUACs. See 87 FR 18290, 18293. The 13.9 SEER2 level was incorrectly presented in the March 2022 NOPR and has been corrected for this final rule to match the 12.7

<sup>6</sup> EPCA’s anti-backsliding provision prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I))

SEER2 level presented by both the March 2022 NOPR's crosswalk results in "Table III-1" and the March 2022 NOPR's proposed regulatory text. *Id.* at 87 FR 18299, 18311.

**Table I.2 Energy Conservation Standards for Air-Cooled, Three-Phase, VRF Multi-Split Air Conditioners and Heat Pumps with a Cooling Capacity of Less Than 65,000 Btu/h (Compliance Starting January 1, 2025)**

Equipment Type	Size Category (Cooling)	Subcategory	Minimum Efficiency <sup>1</sup>
VRF Air Conditioners	< 65,000 Btu/h	Split System	13.4 SEER2
VRF Heat Pumps	< 65,000 Btu/h	Split System	13.4 SEER2 7.5 HSPF2

<sup>1</sup> The adopted standards for three-phase, less than 65,000 Btu/h VRF are more stringent than those standards proposed in "Table I-2" of the March 2022 NOPR, as to align with the minimum efficiency levels prescribed by ASHRAE 90.1-2022. *See* 87 FR 18290, 18293.

## II. Introduction

The following section briefly discusses the statutory authority underlying this final rule, as well as some of the relevant historical background related to the establishment of energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF.

### *A. Authority*

EPCA authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. Title III, Part C of EPCA, added by Pub. L. 95-619, Title IV, section 441(a) (42 U.S.C. 6311-6317, as codified), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency for covered equipment. This covered equipment includes three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF, the subject of this rulemaking. (42 U.S.C. 6311(1)(B)) Pursuant to EPCA, DOE is to consider amending the energy efficiency standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever ASHRAE amends the standard levels or design requirements prescribed in ASHRAE/IES Standard 90.1, and, at a minimum, every 6 years. (42 U.S.C. 6313(a)(6)(A)-(C))

The energy conservation program under EPCA, consists essentially of four parts: (1) testing, (2) labeling, (3) the establishment of Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA include definitions (42 U.S.C. 6311), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), energy conservation standards (42 U.S.C. 6313), and the authority to require information and reports from manufacturers (42 U.S.C. 6316; 42 U.S.C. 6296).

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (*See* 42 U.S.C. 6316(a) and (b); 42 U.S.C. 6297) DOE may, however, grant waivers of Federal preemption in limited instances for particular State laws or regulations, in accordance with the procedures and other provisions set forth under EPCA. (*See* 42 U.S.C. 6316(b)(2)(D))

Subject to certain criteria and conditions, DOE is required to develop test procedures to measure the energy efficiency, energy use, or estimated annual operating cost of each covered product. Manufacturers of covered equipment must use the Federal test procedures as the basis for: (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(b); 42 U.S.C. 6296), and (2) making representations about the efficiency of that equipment (42 U.S.C. 6314(d)). Similarly, DOE uses these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. The current DOE test procedures for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF appear at 10 CFR part 431, subpart F, appendix F1. The outdated test procedures for these equipment, referenced by the current energy conservation standards, appear at 10 CFR part 431, subpart F, appendix F.

ASHRAE Standard 90.1 sets industry energy efficiency levels for small, large, and very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners, packaged terminal heat pumps, warm air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks (collectively ASHRAE equipment). For each type of listed equipment, EPCA directs that if ASHRAE amends Standard 90.1, DOE must adopt amended standards at the new ASHRAE efficiency level, unless DOE determines, supported by clear and convincing evidence, that adoption of a more stringent level would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) Under EPCA, DOE must also review energy efficiency standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF every six years and either: (1) issue a notice of determination that the standards do not need to be amended as adoption of a more stringent level is not supported by clear and convincing evidence; or (2) issue a notice of proposed rulemaking including new proposed standards based on certain criteria and procedures in subparagraph (B).<sup>7</sup> (42 U.S.C. 6313(a)(6)(C))

In deciding whether a more-stringent standard is economically justified, under either the provisions of 42 U.S.C. 6313(a)(6)(A) or 42 U.S.C. 6313(a)(6)(C), DOE must determine whether the benefits of the standard exceed its burdens. DOE must make this determination after receiving comments on the proposed standard, and by considering, to the maximum extent practicable, the following seven factors:

---

<sup>7</sup> In relevant part, subparagraph (B) specifies that: (1) in making a determination of economic justification, DOE must consider, to the maximum extent practicable, the benefits and burdens of an amended standard based on the seven criteria described in EPCA; (2) DOE may not prescribe any standard that increases the energy use or decreases the energy efficiency of a covered product; and (3) DOE may not prescribe any standard that interested persons have established by a preponderance of evidence is likely to result in the unavailability in the United States of any product type (or class) of performance characteristics (including reliability, features, sizes, capacities, and volumes) that are substantially the same as those generally available in the United States. (42 U.S.C. 6313(a)(6)(B)(ii)-(iii))

- (1) The economic impact of the standard on manufacturers and consumers of products subject to the standard;
- (2) The savings in operating costs throughout the estimated average life of the covered products in the type (or class) compared to any increase in the price, initial charges, or maintenance expenses for the covered equipment that are likely to result from the standard;
- (3) The total projected amount of energy savings likely to result directly from the standard;
- (4) Any lessening of the utility or the performance of the covered product likely to result from the standard;
- (5) The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the standard;
- (6) The need for national energy conservation; and
- (7) Other factors the Secretary of Energy considers relevant.

(42 U.S.C. 6313(a)(6)(B)(ii)(I) through (VII))

EPCA, as codified, also contains what is known as an “anti-backsliding” provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I)) Also, the Secretary may not prescribe an amended or new standard if interested persons have established by a preponderance of the evidence that the standard is likely to result in the unavailability in the United States in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States. (42 U.S.C. 6313(a)(6)(B)(iii)(II)(aa))

## *B. Background*

### 1. Current Standards

EPCA defines “commercial package air conditioning and heating equipment” as air-cooled, water-cooled, evaporatively-cooled, or water-source (not including ground water source) electrically operated, unitary central air conditioners and central air conditioning heat pumps for commercial application. (42 U.S.C. 6311(8)(A); 10 CFR 431.92) EPCA further classifies “commercial package air conditioning and heating equipment” into categories based on cooling capacity (*i.e.*, small, large, and very large categories). (42 U.S.C. 6311(8)(B)-(D); 10 CFR 431.92) “Small commercial package air conditioning and heating equipment” means equipment rated below 135,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(B); 10 CFR 431.92) “Large commercial package air conditioning and heating equipment” means equipment rated: (i) at or above 135,000 Btu per hour; and (ii) below 240,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(C); 10 CFR 431.92) “Very large commercial package air conditioning and heating equipment” means equipment rated: (i) at or above 240,000 Btu per hour; and (ii) below 760,000 Btu per hour (cooling capacity). (42 U.S.C. 6311(8)(D); 10 CFR 431.92)

The energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs were most recently amended through a final rule for energy conservation standards and test procedures for certain commercial heating, air-conditioning and water heating equipment published in the *Federal Register* on July 17, 2015. 80 FR 42614 (July 2015 final rule). For three of the four equipment classes of three-phase, less than 65,000 Btu/h ACUACs and ACUHPs (packaged air conditioners, packaged heat pumps, and split-system heat pumps), the July 2015 final rule adopted energy conservation standards that correspond to the levels in the 2013 revision of ASHRAE Standard 90.1. *Id.* at 80 FR 42616. For the remaining equipment class (split-

system air conditioners), the July 2015 final rule did not amend the energy conservation standards. *Id.*

DOE's current energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs are codified at Tables 3 and 4 of 10 CFR 431.97. The current equipment classes are differentiated by configuration (split system or single package) and by heating capability (air conditioner or heat pump) and repeated in Table II.1 of this document.

Pursuant to its authority under EPCA (42 U.S.C. 6313(a)(6)(A)) and in response to updates to ASHRAE Standard 90.1, DOE has established the category of VRF multi-split systems, which meets the EPCA definition of "commercial package air conditioning and heating equipment," but which EPCA did not expressly identify. *See* 10 CFR 431.92; 10 CFR 431.97.

DOE defines "variable refrigerant flow air conditioner" as a unit of commercial package air-conditioning and heating equipment that is configured as a split system air conditioner incorporating a single refrigerant circuit, with one or more outdoor units, at least one variable-speed compressor or an alternate compressor combination for varying the capacity of the system by three or more steps, and multiple indoor fan coil units, each of which is individually metered and individually controlled by an integral control device and common communications network and which can operate independently in response to multiple indoor thermostats. Variable refrigerant flow implies three or more steps of capacity control on common, inter-connecting piping. 10 CFR 431.92.

DOE defines "variable refrigerant flow multi-split heat pump" as a unit of commercial package air-conditioning and heating equipment that is configured as a split system heat pump that uses reverse cycle refrigeration as its primary heating source and which may include secondary supplemental heating by means of electrical resistance, steam, hot water, or gas. The equipment incorporates a single refrigerant circuit, with



one or more outdoor units, at least one variable-speed compressor or an alternate compressor combination for varying the capacity of the system by three or more steps, and multiple indoor fan coil units, each of which is individually metered and individually controlled by a control device and common communications network and which can operate independently in response to multiple indoor thermostats. Variable refrigerant flow implies three or more steps of capacity control on common, inter-connecting piping. 10 CFR 431.92.

DOE adopted energy conservation standards specific to VRF multi-split systems in a final rule published on May 16, 2012. 77 FR 28928 (May 2012 final rule). When determining the appropriate standard levels, DOE considered updates to the 2010 edition of ASHRAE Standard 90.1 (ASHRAE 90.1-2010), which designated separate equipment classes for VRF multi-split systems for the first time. *Id.* at 77 FR 28934. For three-phase, less than 65,000 Btu/h VRF, DOE maintained the standards from the equipment class under which the corresponding VRF multi-split system equipment class was previously regulated (*i.e.*, three-phase, less than 65,000 Btu/h VRF had previously been covered as three-phase, less than 65,000 Btu/h ACUACs and ACUHPs). *Id.* at 77 FR 28938.

DOE's current equipment classes for three-phase, less than 65,000 Btu/h VRF are differentiated only by refrigeration cycle (air conditioners or heat pumps). DOE's current standards for VRF multi-split systems are set forth at Table 13 to 10 CFR 431.97 and repeated in Table II.2 of this document.

**Table II.1 Current Federal Energy Conservation Standards for Air-Cooled, Three-Phase, Small Commercial Package Air Conditioners and Heating Equipment with a Cooling Capacity of Less Than 65,000 Btu/h**

Equipment Type	Cooling Capacity	Subcategory	Heating Type	Efficiency Level	Compliance Date:
Small Commercial Package Air Conditioner and Heating Equipment (Air-Cooled, 3-Phase, Split-System)	< 65,000 Btu/h	AC	All	13 SEER	June 16, 2008
		HP	All	14 SEER 8.2 HSPF	January 1, 2017
Small Commercial Package Air Conditioning and Heating Equipment (Air-Cooled, 3-Phase, Single-Package)	< 65,000 Btu/h	AC	All	14 SEER	January 1, 2017
		HP	All	14 SEER 8.0 HSPF	January 1, 2017

**Table II.2 Current Federal Energy Conservation Standards for Air-Cooled, Three-Phase, Variable Refrigerant Flow Air Conditioners and Heat Pumps with a Cooling Capacity of Less Than 65,000 Btu/h**

Equipment Type	Cooling Capacity	Heating Type	Efficiency Level	Compliance Date:
VRF Multi-Split Air Conditioners (Air-Cooled)	< 65,000 Btu/h	All	13 SEER	June 16, 2008
VRF Multi-Split Heat Pumps (Air-Cooled)	< 65,000 Btu/h	All	13 SEER 7.7 HSPF	June 16, 2008

## 2. ASHRAE 90.1

As previously discussed, ASHRAE released ASHRAE 90.1-2019 in October 2019, which updated the test procedure references, efficiency metrics, and efficiency levels for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs. ASHRAE later released ASHRAE 90.1-2022 in January 2023, which also updated the test procedure references, efficiency metrics, and efficiency levels for three-phase, less than 65,000 Btu/h VRF. ASHRAE 90.1-2022 incorporates the more stringent SEER2/HSPF2 efficiency levels for three-phase, less than 65,000 Btu/h VRF found in Addendum ‘ay’ to

ASHRAE 90.1-2019. As the test procedures, efficiency metrics, and efficiency levels prescribed in ASHRAE 90.1-2022 for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs did not change from ASHRAE 90.1-2019, new analysis of three-phase, less than 65,000 Btu/h ACUACs and ACUHPs was not required for this final rule by the release of ASHRAE 90.1-2022.

For three-phase, less than 65,000 Btu/h ACUACs and ACUHPs, the current DOE energy conservation standards reference the outdated test procedure in appendix F, which, in turn, reference the industry test procedure, AHRI 210/240-2008, and measures performance in terms of SEER and HSPF. ASHRAE 90.1-2019 references the updated industry test procedure AHRI 210/240-2023, which measures performance in terms of SEER2 and HSPF2. As discussed in section III of this document, DOE conducted a crosswalk analysis to determine whether the new metrics and efficiency levels in ASHRAE 90.1-2019 represent at least equivalent stringency as compared to the existing DOE standards in terms of SEER and HSPF. DOE's crosswalk analysis determined that ASHRAE 90.1-2019 increased the stringency of cooling and heating mode efficiency levels for the two DOE equipment classes of three-phase, split-system, less than 65,000 Btu/h ACUAC and ACUHP equipment while leaving unchanged the stringency of single-packaged, three-phase equipment.

Regarding three-phase, less than 65,000 Btu/h VRF, ASHRAE 90.1-2022 also updates the relevant industry test procedure. The outdated test procedure in appendix F, referenced by the current DOE energy conservation standards, reference the industry test procedure, AHRI 1230-2010. ASHRAE 90.1-2022 updates this reference to the updated industry test procedure AHRI 210/240-2023, which measures performance in terms of SEER2 and HSPF2. As discussed in section III of this document, DOE conducted a crosswalk analysis to determine whether the new metrics and efficiency levels in ASHRAE 90.1-2022 represent at least equivalent stringency as compared to the existing

DOE standards in terms of SEER and HSPF for three-phase, less than 65,000 Btu/h VRF. DOE's crosswalk analysis determined that ASHRAE 90.1-2022 increased the stringency of both cooling and heating mode efficiency levels for air-cooled, three-phase, less than 65,000 Btu/h VRF.

### 3. September 2020 NODA/RFI

DOE published a notice of data availability and request for information (NODA/RFI) in response to the amendments to ASHRAE 90.1-2019 in the *Federal Register* on September 25, 2020. 85 FR 60642 (September 2020 NODA/RFI). In the September 2020 NODA/RFI, DOE compared the current Federal standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs (in terms of SEER and HSPF) to the levels in ASHRAE 90.1-2019 (in terms of SEER2 and HSPF2) and requested comment on its preliminary findings. *Id.* at 85 FR 60662-60666. The September 2020 NODA/RFI did not address standards for three-phase, less than 65,000 Btu/h VRF.

### 4. March 2022 NOPR

In the March 2022 NOPR, DOE proposed amended energy conservation standards for both three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF. 87 FR 18290, 18293. The proposed amended standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs were based on the preliminary crosswalk analysis first presented in the September 2020 NODA/RFI and extended into the March 2022 NOPR. *Id.* at 87 FR 18296-18298. The proposed amended standards for three-phase, less than 65,000 Btu/h VRF utilized additional crosswalk analysis conducted for and found only in the March 2022 NOPR. *Id.* at 87 FR 18298-18299. DOE received six comments in response to the issues raised in the March 2022 NOPR from the interested parties listed in Table II.3.

**Table II.3 List of Commenters with Written Submissions to the March 2022 NOPR**

<b>Commenter(s)</b>	<b>Abbreviation</b>	<b>Comment No. in the Docket</b>	<b>Commenter Type</b>
Air-Conditioning, Heating and Refrigeration Institute	AHRI	10	Manufacturer Trade Group
Lennox International Inc.	Lennox	07	Manufacturer
Carrier Corporation	Carrier	06	Manufacturer
California Investor-Owned Utilities	CA IOUs	08	Advocacy Group
Appliance Standards Awareness Project, American Council for an Energy-Efficient Economy, Northwest Energy Efficiency Alliance	Joint Advocates	09	Advocacy Group
National Institute of Standards and Technology	NIST	02	Government Agency

A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record.<sup>8</sup> To the extent that interested parties have provided written comments that are substantively consistent with any oral comments provided during the May 16, 2022, public meeting, DOE cites the written comments throughout this final rule. DOE did not receive any oral comments during the webinar that substantively differ from written comments; therefore, oral comments are not summarized in this final rule.

DOE notes that the standards proposed for three-phase, less than 65,000 Btu/h VRF in the March 2022 NOPR are less stringent than those adopted in this final rule. The March 2022 NOPR crosswalked current Federal standards from SEER and HSPF metrics to the newer SEER2 and HSPF2 metrics for these systems as the March 2022 NOPR was published prior to publication of ASHRAE 90.1-2022. In the March 2022 NOPR, DOE also proposed, however, that standard levels of equivalent stringency to those in Addendum ‘ay’ to ASHRAE 90.1-2019 would be adopted should those standard levels be incorporated into an updated version of ASHRAE 90.1 before publication of

---

<sup>8</sup> The parenthetical reference provides a reference for information located in the docket of DOE’s rulemaking to develop energy conservation standards for three-phase, small commercial package air conditioning and heating equipment with a cooling capacity of less than 65,000 Btu/h. (Docket No. EERE-2022-BT-STD-0008, which is maintained at [www.regulations.gov](http://www.regulations.gov)). The references are arranged as follows: (commenter name, comment docket ID number, page of that document).

this final rule. 87 FR 18290, 18304. As previously mentioned, an updated version of ASHRAE 90.1, ASHRAE 90.1-2022, was published in January 2023 and includes updated standard levels for three-phase, less than 65,000 Btu/h VRF. Thus, standards for three-phase, less than 65,000 Btu/h VRF adopted in this final rule are of equivalent stringency to those in ASHRAE 90.1-2022 and are more stringent than the current Federal standards.

### **III. Discussion of Crosswalk Analysis**

#### *A. Crosswalk Background*

The energy conservation standards adopted in this document were developed in response to updates to the relevant industry test standard (*i.e.*, AHRI 210/240-2023), as well as updates to the minimum efficiency levels specified in ASHRAE 90.1-2019. As stated in section II.A of this document, DOE must consider amending the energy efficiency standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever ASHRAE amends the standard levels or design requirements prescribed in ASHRAE Standard 90.1, and at a minimum, every 6 years. (42 U.S.C. 6313(a)(6)(A)-(C)) EPCA also prohibits DOE from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I)); commonly referred to as EPCA's anti-backsliding provision) DOE conducted separate crosswalk analyses for each equipment class to ensure that EPCA's anti-backsliding provision is not violated by the amended standards in this final rule.

As described in the following sections, DOE's crosswalk analysis for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs is consistent with the preliminary crosswalk analysis first presented in the September 2020 NODA/RFI and extended into

the March 2022 NOPR. *See* 85 FR 60642, 60662-60663 and 87 FR 18290, 18296-18298.

The crosswalk in the March 2022 NOPR qualitatively evaluated whether the minimum efficiency levels for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs presented in ASHRAE 90.1-2019 were of higher, lower, or equivalent stringency to the existing Federal standard levels. 87 FR 18290, 18296-18300.

With regards to three-phase, less than 65,000 Btu/h VRF, DOE's crosswalk, described further in the following sections, is consistent with the crosswalk presented for these equipment classes in the March 2022 NOPR, with one exception. For the March 2022 NOPR, DOE's crosswalk qualitatively evaluated whether the minimum efficiency levels for three-phase, less than 65,000 Btu/h VRF presented in ASHRAE 90.1-2019 were of higher, lower, or equivalent stringency to the existing Federal standard levels. *Id.* For this final rule, DOE's crosswalk instead considered the minimum efficiency levels presented in ASHRAE 90.1-2022, rather than ASHRAE 90.1-2019, when evaluating whether the minimum efficiency levels for three-phase, less than 65,000 Btu/h VRF were of higher, lower, or equivalent stringency to the existing Federal standard levels. DOE did not present crosswalk analysis for these equipment classes in any notices (*i.e.*, the September 2020 NODA/RFI) prior to the March 2022 NOPR.

On January 6, 2017, DOE published a direct final rule (DFR) amending energy conservation standards for residential central air conditioners (CACs) and heat pumps (HPs) (collectively CAC/HPs) (January 2017 CAC/HP ECS DFR). 82 FR 1786. The January 2017 CAC/HP ECS DFR established crosswalk translations for CAC/HPs from SEER and HSPF (measured per 10 CFR part 430, subpart B, appendix M (appendix M)) to SEER2 and HSPF2 (measured per 10 CFR part 430, subpart B, appendix M1 (appendix M1)). Specifically, in the January 2017 CAC/HP ECS DFR DOE established multiple SEER-to-SEER2 translations that were unique to the test conditions for each

product class. *Id.* at 82 FR 1849. In the January 2017 CAC/HP ECS DFR, DOE also established an HSPF-to-HSPF2 translation and concluded that the 15 percent reduction from HSPF to HSPF2 that was observed in an earlier rule for split-system and single-package heat pumps was appropriate also for S-C and SDHV heat pumps. *Id.* at 82 FR 1850.

As described in the September 2020 NODA/RFI, AHRI 210/240-2023 aligns test methods and ratings to be consistent with DOE's test procedure for single-phase CACs at appendix M1. 85 FR 60642, 60647. Given that three-phase equipment are generally identical to their single-phase counterparts, aside for three-phase power input, DOE presented a preliminary metric translation for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs based on the metric translation used for single-phase CAC/HPs presented in the January 2017 CAC/HP ECS DFR in the September 2020 NODA/RFI. *Id.* at 85 FR 60662. For three-phase equipment classes with Federal standards matching SEER and HPSF standards in Table V-29 of the January 2017 CAC/HP ECS DFR, DOE used the corresponding SEER2 and HSPF2 values from Table V-30 of the January 2017 CAC/HP ECS DFR. For three-phase equipment classes that did not having matching SEER and/or HSPF values in Table V-29 of the January 2017 CAC/HP ECS DFR, DOE evaluated the stringency of the ASHRAE 90.1-2019 SEER2 and HSPF2 levels relative to the Federal SEER and HSPF standards by qualitatively assessing how the testing method changes made for single phase switching from SEER/HSPF to SEER2/HSPF2 would impact three-phase equipment. *See Id.* at 85 FR 60662-60663.

#### *B. Crosswalk Methodology*

##### 1. Three-phase, Less than 65,000 Btu/h, Single-package and Split-system ACUACs and ACUHPs

Because three-phase, less than 65,000 Btu/h single-package air conditioners and heat pumps have directly comparable single-phase product classes, DOE was able to



utilize the same crosswalk as described in the January 2017 CAC/HP ECS DFR when evaluating the relative stringency of ASHRAE 90.1-2019 levels. *See* 82 FR 1786, 1848-1851. In the September 2020 NODA/RFI, DOE determined that the ASHRAE 90.1-2019 efficiency standards are equivalent to the translated Federal efficiency standards for three-phase, single-package, less than 65,000 Btu/h ACUACs and ACUHPs. 85 FR 60642, 60662-60663. However, for three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs, DOE's crosswalk analysis determined that the levels in ASHRAE 90.1-2019 are more stringent than current Federal standards. *Id.* In the March 2022 NOPR, DOE tentatively determined that it was unnecessary to provide specific crosswalk values for the two equipment classes of three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs for which ASHRAE 90.1-2019 increased stringency as compared to the current Federal standards. 87 FR 18290, 18297.

In response to the March 2022 NOPR, the Joint Advocates, AHRI, Carrier, and Lennox all supported DOE's crosswalk for three-phase, less than 65,000 Btu/h, single-package and split-system ACUACs and ACUHPs. (Joint Advocates, No. 9 at p. 1; AHRI, No. 10 at p. 2; Carrier, No. 6 at p.2; Lennox, No. 7 at p. 2) DOE received no comments opposing DOE's crosswalk methodologies or results. Therefore, in this final rule, DOE is using the same crosswalk methodology for these equipment as proposed in the March 2022 NOPR.

## 2. Three-phase, Less than 65,000 Btu/h, Space-Constrained and Small-Duct, High-Velocity ACUACs and ACUHPs

In its preliminary crosswalk analysis in the September 2020 NODA/RFI, DOE determined that the standards levels for S-C and SDHV equipment found in ASHRAE 90.1-2019 are less stringent than the current Federal standards for the following six equipment classes: (1) S-C, split-system ACUAC; (2) S-C, split-system ACUHP; (3) S-C, single-package ACUAC; (4) S-C, single-package ACUHP; (5) SDHV split-system

ACUAC; and (6) SDHV split-system ACUHP. 85 FR 60642, 60663. DOE's crosswalk showed that the crosswalked Federal standard levels for these equipment classes are qualitatively higher than the SEER2 and/or HSPF2 levels found in ASHRAE 90.1-2019; however DOE did not determine specific values for an appropriate crosswalk. *Id.* Specific values for crosswalked standards were later presented in the March 2022 NOPR. 87 FR 18290, 18299-18300. In the March 2022 NOPR, DOE reiterated that although the standard levels for S-C and SDHV equipment found in ASHRAE 90.1-2019 are less stringent than current Federal standards, it still intends to consider these ASHRAE classes separately in this rulemaking as part of the six-year-lookback review. *Id.* at 87 FR 18297.

In a NOPR published in the *Federal Register* on January 8, 2015, which covered energy conservation standards for commercial HVAC equipment, including three-phase, less than 65,000 Btu/h air conditioners and heat pumps (January 2015 ASHRAE 90.1 NOPR), DOE stated that EPCA does not separate these six additional equipment classes from other types of small commercial package air conditioning and heating equipment in its definitions, and, therefore, EPCA's definition of "small commercial package air conditioning and heating equipment" includes SDHV and S-C air conditioners and heat pumps. 80 FR 1172, 1184. DOE reiterated this position in both the September 2020 NODA/RFI and March 2022 NOPR. *See* 85 FR 60642, 60662; 87 FR 18290, 18297. EPCA generally directs DOE to establish amended uniform national standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs at the minimum levels specified in ASHRAE Standard 90.1. (43 U.S.C. 6313(a)(6)(A)(ii)(I)) As DOE has previously stated, when considering the ASHRAE trigger, DOE evaluates ASHRAE amendments at the class level. Because the six equipment classes of three-phase S-C and SDHV equipment prescribed in ASHRAE 90.1-2019 are covered as small commercial package air conditioning and heating equipment, DOE cannot adopt standard levels that are any

lower than the current Federal standards. However, to distinguish S-C and SDHV equipment from the three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs equipment for which DOE was triggered by more stringent levels in ASHRAE 90.1-2019, DOE proposed to establish separate equipment classes of three-phase S-C and SDHV equipment with separate standard levels in the March 2022 NOPR. 87 FR 18290, 18297. Consistent with EPCA, the levels that DOE proposed for these S-C and SDHV equipment classes maintained equivalent stringency to the current applicable Federal standards and are therefore more stringent than the corresponding levels set forth in ASHRAE 90.1-2019. *Id.*

The Joint Advocates and Lennox both supported DOE's crosswalk for three-phase S-C and SDHV equipment (Joint Advocates, No. 9 at p. 1; Lennox, No. 7 at p. 2). No comments were received in opposition to DOE's crosswalk methodologies or results. However, while no opposition to the crosswalk analysis was received, AHRI, CA IOUs, and Carrier all commented in opposition of adopting the crosswalk results for S-C and SDHV equipment as energy conservation standards because these are not aligned with efficiency levels specified in ASHRAE 90.1-2019. (AHRI, No. 10 at p. 2; CA IOUs, No. 8 at pp. 2-3; Carrier, No. 6 at p. 2)

In particular, AHRI urged DOE to set levels for three-phase, less than 65,000 Btu/h, S-C and SDHV ACUACs and ACUHPs consistent with the levels specified in ASHRAE 90.1, which are harmonized with the single-phase equivalents for these equipment. (AHRI, No. 10 at p. 2) AHRI noted that there is little difference in operation, function, and performance between these three-phase equipment classes and their single-phase counterparts (at less than 65,000 Btu/h capacities), and stated that this is why ASHRAE 90.1 minimum levels for three-phase equipment have always been harmonized with their single-phase counterparts. (*Id.*) Further, with no publicly available data for three-phase S-C and SDHV equipment (because there are no known

commercially available equipment of these types), AHRI contended that DOE has no basis for developing an alternate market baseline (*i.e.* at conventional single-phase systems) for these equipment. (*Id.* at p. 3) AHRI asserted that commercial three-phase outdoor units that match to SDHV indoor units are single stage, and that variable stage or even two stage units, which do not yet exist, would be required to meet the Federal energy conservation standards at issue. (*Id.*) AHRI asked how three-phase S-C and SDHV equipment manufacturers would proceed to comply with unachievable levels. (*Id.*) Additionally, AHRI commented that the S-C and SDHV commercial market size is unknown although estimated to be small. (*Id.*) Because commercial applications that should be using three-phase commercial equipment are using single-phase residential products, AHRI explained that it is impossible for manufacturers to know the size of those markets for their equipment. (*Id.*) AHRI suggested that giving the end-user the option to install three-phase commercial versions of S-C and SDHV equipment will allow building owners to better balance the power from each leg, which improves power factor, efficiency, and reduces their costs. (*Id.*)

CA IOUs also encouraged DOE to consider adopting the efficiency levels specified in ASHRAE 90.1-2019 for three-phase, less than 65,000 Btu/h S-C and SDHV ACUACs and ACUHPs. (CA IOUs, No. 8 at p. 2) In their comment, CA IOUs highlighted that there are only negligible differences in performance between these three-phase equipment and their single-phase counterparts, and also observed that there are no models of three-phase S-C and SDHV ACUACs and ACUHPs currently on the market, consistent with DOE's tentative conclusion in the March 2022 NOPR. (*Id.* at pp. 2-3) In their analysis of DOE's Compliance Certification Management System (CCMS), CA IOUs approximated that over 90 percent of basic single-phase S-C and SDHV consumer products would fall below the standards for three-phase S-C and SDHV ACUACs and ACUHPs proposed in the March 2022 NOPR. (*Id.* at p. 3) With these observations in

mind, CA IOUs warned that setting an overly stringent standard for equipment not yet on the market may preclude the future introduction of such equipment and potentially deprive consumers of any potential consumer utility offered by such equipment. (*Id.*) In addition, CA IOUs cautioned that the lack of available three-phase S-C and SDHV equipment makes it challenging to assess if the proposed standards in the March 2022 NOPR are technologically feasible and economically justified. (*Id.* at p. 3)

Carrier also supported aligning standards for three-phase, less than 65,000 Btu/h S-C and SDHV equipment with their single-phase counterparts, as they are aligned in ASHRAE 90.1. (Carrier, No. 6 at p. 2) Carrier noted that manufacturers typically have one design for S-C and SDHV equipment, with options for different power supplies, which do not affect energy efficiency. (*Id.*) As a result, Carrier cautioned that requiring different minimum efficiency levels for products that are essentially the same design creates undue burden for the industry. (*Id.*)

In response to AHRI, DOE notes that it is obligated to conduct a crosswalk regardless of whether there is any equipment on the market. DOE also notes that it conducted its crosswalk using what it considered the most appropriate data from similar classes of equipment, and no negative comments were received on the crosswalk analysis presented in the March 2022 NOPR.

In response to concerns regarding alignment with ASHRAE 90.1-2019, DOE notes that EPCA, as codified, contains what is known as an “anti-backsliding” provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I)) DOE understands that this final rule creates a discrepancy between the standards of three-phase, less than 65,000 Btu/h S-C and SDHV equipment and their single-phase counterparts, but DOE is unable to adopt

standards lower than current Federal standards, as this would violate EPCA's anti-backsliding provision.

In the March 2022 NOPR, DOE developed a crosswalk for S-C, split-system, and single-package ACUACs and ACUHPs and SDHV ACUACs and ACUHPs by applying similar translations as observed in the January 2017 CAC/HP ECS DFR for single-phase S-C and SDHV equipment to the existing Federal standards for small commercial package air conditioners and heat pumps. 87 FR 18290, 18297-18298. In this final rule, DOE is utilizing the same crosswalk as presented in both the March 2022 NOPR and September 2020 NODA/RFI. *See* 87 FR 18290, 18299-18300; 85 FR 60642, 60662-60663. DOE reiterates that it is not aware of any models of three-phase, less than 65,000 Btu/h S-C or SDHV equipment currently on the market, and comments received in response to the March 2022 NOPR support this observation.

a. Space-Constrained Equipment

Single-phase S-C air conditioners, for which energy conservation standards are not further separated into split-systems and single-package systems, have a DOE minimum SEER of 12 that was translated to 11.7 SEER2. 82 FR 1786, 1848-1849. Single-phase S-C heat pumps also have a minimum SEER of 12, but the January 2017 CAC/HP ECS DFR established a different translated SEER2 of 11.9. *Id.* This difference in the SEER2 requirement between S-C air conditioners and S-C heat pumps is due to differences in the requirements for determination of represented values codified at Table 1 to paragraph (a)(1) of 10 CFR 429.16. In the December 2022 Three-Phase TP final rule, DOE aligned the representation requirements for three-phase, less than 65,000 Btu/h equipment with the representation requirements for single-phase CAC/HPs. 87 FR 77298, 77312.

Accordingly, in this document, DOE is using the same cooling-metric translations for three-phase, space-constrained equipment as the translations present for single-phase,

space-constrained equipment (*i.e.*, applying a 0.3 point SEER2 decrement for space-constrained air conditioners and a 0.1 point SEER2 decrement for space-constrained heat pumps). DOE notes that split-system S-C ACUACs are currently covered under the Federal standard of 13.0 SEER for three-phase, split-system, less than 65,000 Btu/h ACUACs, whereas S-C split-system ACUHPs and S-C single-package ACUACs and ACUHPs are each covered under corresponding DOE equipment classes with a standard of 14 SEER.<sup>9</sup>

With regards to the translation from HSPF to HSPF2 for S-C ACUACs and ACUHPs, DOE used the same 15 percent reduction from the January 2017 CAC/HP ECS DFR when translating from HSPF to HSPF2 at an equivalent stringency. Because the changes to the heating load line between AHRI 210/240-2008 and AHRI 210/240-2023 are equivalent to the changes in the heating load line between appendix M and appendix M1, DOE has concluded that utilizing the same HSPF2 translation from single-phase CAC/HPs is appropriate for S-C ACUACs and ACUHPs.

#### b. Small-Duct, High-Velocity Equipment

For single-phase SDHV CAC/HPs, there is no increase in external static pressure requirements in appendix M1 as compared to appendix M. Consequently, in the January 2017 CAC/HP ECS DFR, there was no decrease in numerical value when translating standards from SEER to SEER2. 82 FR 1786, 1848-1849. Given that the test procedures for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs are aligned with the test procedures for single-phase CAC/HPs, there are also no increases in external static pressure requirements for SDHV ACUACs and ACUHPs in AHRI 210/240-2023. Therefore, DOE did not use a decrement when translating from SEER to SEER2 for SDHV ACUACs and ACUHPs.

---

<sup>9</sup> See table in paragraph (c)(1) of 10 CFR 430.32 for current standards.

For the heating mode for SDHV ACUHPs, DOE used the same 15 percent reduction from the January 2017 CAC/HP ECS DFR when translating from HSPF to HSPF2. *Id.* at 82 FR 1850. Because the changes to the heating load line between AHRI 210/240-2008 and AHRI 210/240-2023 are equivalent to the changes in the heating load line between appendix M and appendix M1, DOE has concluded that utilizing the same HSPF2 translation from single-phase CAC/HPs is appropriate for SDHV ACUACs and ACUHPs.

### 3. Three-phase, Less than 65,000 Btu/h VRF

The outdated test procedure in appendix F for VRF multi-split systems (including three-phase, less than 65,000 Btu/h VRF) references AHRI 1230-2010 with addendum 1. For three-phase, less than 65,000 Btu/h VRF, AHRI 1230-2010 is used to calculate cooling and heating efficiency in terms of the SEER and HSPF metrics, respectively. In May 2021, AHRI published AHRI 1230-2021, which excludes from its scope three-phase, less than 65,000 Btu/h VRF. Accordingly, in the December 2022 Three-Phase TP final rule, DOE removed its reference to AHRI 1230-2010 and instead referenced AHRI 210/240-2023 in the test procedure for three-phase, less than 65,000 Btu/h VRF. 87 FR 77298, 77301-77302. In that final rule, DOE noted that AHRI 210/240-2023 includes in its scope three-phase, less than 65,000 Btu/h VRF and harmonizes with the updated Federal test method for single-phase central air conditioners and central air conditioning heat pumps with rated cooling capacities of less than 65,000 Btu/h (*i.e.*, appendix M1, which became effective January 1, 2023), which includes single-phase, air-cooled, VRF systems with a cooling capacity of less than 65,000 Btu/h. 87 FR 77298, 77304. Like appendix M1, AHRI 210/240-2023 is used to calculate cooling and heating efficiency in terms of updated metrics, SEER2 and HSPF2, respectively. As discussed in section II.B.2 of this document, ASHRAE 90.1-2022 established SEER2 and HSPF2 levels for three-phase, less than 65,000 Btu/h VRF.



To translate the existing SEER and HSPF levels to SEER2 and HSPF2 levels of equivalent stringency, DOE conducted a crosswalk analysis for three-phase, less than 65,000 Btu/h VRF in the March 2022 NOPR. Unlike the other equipment classes addressed in sections III.B.1 and III.B.2 of this document, DOE could not rely on existing analysis specific to multi-split systems from the January 2017 CAC/HP ECS DFR and instead conducted an analytical crosswalk for this equipment by evaluating changes in the test procedure between AHRI 1230-2010 and AHRI 210/240-2023. 87 FR 18290, 18298-18299. When deciding how to translate SEER to SEER2, DOE concluded no change in the numerical value of SEER2 standards is needed to crosswalk from existing SEER standards. *Id.* at 87 FR 18299. With regards to the translation from HSPF to HSPF2, DOE determined that the same 15 percent reduction from the January 2017 CAC/HP ECS DFR when translating from HSPF to HSPF2 at an equivalent stringency was appropriate. *Id.* DOE did not receive any comments in opposition to this crosswalk methodology in response to the March 2022 NOPR.

As mentioned earlier, ASHRAE officially released ASHRAE 90.1-2022 prior to publication of this final rule. Thus, unlike the March 2022 NOPR, which compared standard levels for three-phase, less than 65,000 Btu/h VRF to those standards specified in ASHRAE 90.1-2019, this crosswalk analysis compares standards to those specified in ASHRAE 90.1-2022.

### *C. Crosswalk Results*

DOE utilized the crosswalk discussed in section III.B of this document to translate the current Federal standards to the SEER2 and HSPF2 metrics and determine whether the levels specified in ASHRAE 90.1-2019 (or ASHRAE 90.1-2022, as applicable) represent more, less, or equivalent stringency as compared to the current Federal standards. DOE's crosswalk results for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF are presented in

Table III.1 of this document. Results for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs are consistent with the results presented in the March 2022 NOPR. *Id.* at 87 FR 18299. Results for the two equipment classes of three-phase, less than 65,000 Btu/h VRF have changed, as their current Federal standards are compared to the more stringent standard levels specified in ASHRAE 90.1-2022, rather than those specified in ASHRAE 90.1-2019.

**Table III.1 Crosswalk Results for Air-Cooled, Three-Phase, Less than 65,000 Btu/h ACUAC, ACUHP, and VRF Equipment**

ASHRAE 90.1-2019 Equipment Class	Current Federal Equipment Class	Federal Energy Conservation Standard(s)	Crosswalk of Current Federal Standard(s)	Energy Efficiency Levels in ASHRAE 90.1-2019	Comparison of ASHRAE 90.1-2019 to Crosswalk <sup>1</sup>
Air-cooled Air Conditioner, Three-Phase, Single-Package, <65,000 Btu/h	Air-cooled Air Conditioner, Three-Phase, Single-Package, <65,000 Btu/h	14.0 SEER	13.4 SEER2	14.0 SEER before 1/1/2023 13.4 SEER2 on and after 1/1/2023	Equivalent
Air-cooled Air Conditioner, Three-Phase, Split-System, <65,000 Btu/h	Air-cooled Air Conditioner, Three-Phase, Split-System, <65,000 Btu/h	13.0 SEER	<13.0 SEER2 <sup>2</sup>	13.0 SEER before 1/1/2023 13.4 SEER2 on and after 1/1/2023	More Stringent
Air-cooled Heat Pump, Three-Phase, Single-Package, <65,000 Btu/h	Air-cooled Heat Pump, Three-Phase, Single-Package, <65,000 Btu/h	14.0 SEER 8.0 HSPF	13.4 SEER2 6.7 HSPF2	14.0 SEER/8.0 HSPF before 1/1/2023 13.4 SEER2/6.7 HSPF on and after 1/1/2023	Equivalent
Air-cooled Heat Pump, Three-Phase, Split-System, <65,000 Btu/h	Air-cooled Heat Pump, Three-Phase, Split-System, <65,000 Btu/h	14.0 SEER 8.2 HSPF	13.4 SEER2 <7.5 HSPF2 <sup>3</sup>	14.0 SEER/8.2 HSPF before 1/1/2023 14.3 SEER2/7.5 HSPF2 on and after 1/1/2023	More Stringent
Space-Constrained, Air-cooled Air Conditioner, Three-Phase, Single-Package, ≤30,000 Btu/h	Air-cooled Air Conditioner, Three-Phase, Single-Package, <65,000 Btu/h	14.0 SEER	13.9 SEER2	12.0 SEER before 1/1/2023 11.7 SEER2 on and after 1/1/2023	Less Stringent <sup>3</sup>
Space-Constrained, Air-cooled Air Conditioner, Three-Phase, Split-System, ≤30,000 Btu/h	Air-cooled Air Conditioner, Three-Phase, Split-System, <65,000 Btu/h	13.0 SEER	12.7 SEER2	12.0 SEER before 1/1/2023 11.7 SEER2 on and after 1/1/2023	Less Stringent <sup>3</sup>
Space-Constrained, Air-Cooled Heat Pump, Three-Phase, Single-Package, ≤30,000 Btu/h	Air-cooled Heat Pump, Three-Phase, Single-Package, <65,000 Btu/h	14.0 SEER 8.0 HSPF	13.9 SEER2 6.7 HSPF2	12.0 SEER/7.4 HSPF before 1/1/2023 11.7 SEER2/6.3 HSPF2 on and after 1/1/2023	Less Stringent <sup>3</sup>

Space-Constrained, Air-cooled Heat Pump, Three-Phase, Split-System, ≤30,000 Btu/h	Air-cooled Heat Pump, three-phase, Split-System, <65,000 Btu/h	14.0 SEER 8.2 HSPF	13.9 SEER2 7.0 HSPF2	12.0 SEER/7.4 HSPF before 1/1/2023 11.7 SEER2/6.3 HSPF2 on and after 1/1/2023	Less Stringent <sup>3</sup>
Small Duct High Velocity, Air-cooled Air Conditioner, Three-Phase, Split-System, <65,000 Btu/h	Air-cooled Air Conditioner, Three-Phase, Split-System, <65,000 Btu/h	13.0 SEER	13.0 SEER2	12.0 SEER before 1/1/2023 12.0 SEER2 on and after 1/1/2023	Less Stringent <sup>3</sup>
Small Duct, High Velocity, Air-cooled Heat Pump, Three-Phase, Split-System, <65,000 Btu/h	Air-cooled Heat Pump, Three-Phase, Split-Package, <65,000 Btu/h	14.0 SEER 8.2 HSPF	14.0 SEER2 6.9 HSPF2	12.0 SEER/7.2 HSPF before 1/1/2023 12.0 SEER2/6.1 HSPF2 on and after 1/1/2023	Less Stringent <sup>3</sup>
VRF, Air-Cooled, Air Conditioner	Air-cooled VRF Multi-Split Air Conditioners, < 65,000 Btu/h	13.0 SEER	12.9 SEER2	13.0 SEER before 1/1/2023 13.4 SEER2 on and after 1/1/2023 <sup>4</sup>	More Stringent
VRF, Air-Cooled, Heat Pump	Air-cooled VRF Multi-Split Heat Pumps, < 65,000 Btu/h	13.0 SEER 7.7 HSPF	12.9 SEER2 6.5 HSPF2	13.0 SEER/7.7 HSPF before 1/1/2023 13.4 SEER2/7.5 HSPF2 on and after 1/1/2023 <sup>4</sup>	More Stringent

<sup>1</sup> Column indicates whether the ASHRAE 90.1-2019 standard levels (or ASHRAE 90.1-2022 standards, as applicable) are less stringent, equivalent to, or more stringent than the crosswalked Federal standards.

<sup>2</sup> The Federal SEER standard is lower than the ASHRAE 90.1-2019 SEER2 level indicating that the crosswalked Federal SEER2 standard will also be lower than the ASHRAE 90.1-2019 SEER2 level.

<sup>3</sup> For S-C and SDHV equipment, the ASHRAE 90.1 levels are less stringent than the crosswalked Federal efficiency levels because these classes are split off from split-system and single-package, respectively.

<sup>4</sup> Standard levels for the two equipment classes of three-phase, less than 65,000 Btu/h VRF are compared to levels specified by ASHRAE 90.1-2022, not ASHRAE 90.1-2019.

#### IV. Estimates of Potential Energy Savings

As required under 42 U.S.C. 6313(a)(6)(A)(i), for three-phase, less than 65,000 Btu/h CUAC equipment classes for which ASHRAE 90.1-2019 set more stringent levels than the current Federal standards, DOE performed an assessment to determine the energy-savings potential of amending Federal standard levels to reflect the efficiency levels specified in ASHRAE 90.1-2019. The two equipment classes analyzed in the September 2020 NODA/RFI were air-cooled, three-phase, split-system, less than 65,000 Btu/h air conditioners and air-cooled, three-phase, split-system, less than 65,000 Btu/h heat pumps. In the September 2020 NODA/RFI, DOE presented the methodology to determine energy savings along with the findings of the energy savings potential for the two equipment classes and sought comment on the analysis. 85 FR 60642, 60666-60673.

In its analysis for the March 2022 NOPR and this final rule, DOE did not make any changes to the inputs into the energy savings analysis that was presented in the September 2020 NODA/RFI. In the September 2020 NODA/RFI, DOE estimated the potential site, primary, and full-fuel-cycle (FFC) energy savings in quads (*i.e.*, 10<sup>15</sup> Btu) for adopting ASHRAE 90.1-2019 for the two equipment classes analyzed. 85 FR 60642, 60672-60673. The potential energy savings of adopting ASHRAE 90.1-2019 levels are measured relative to the current Federal standards. Table IV.1 displays the energy savings at the ASHRAE level for air-cooled, three-phase, split-system air conditioners less than 65,000 Btu/h and air-cooled, three-phase, split-system heat pumps less than 65,000 Btu/h. The values in the table below are identical to the values presented in both the September 2020 NODA/RFI and March 2022 NOPR. 85 FR 60642, 60673; 87 FR 18290, 18300.

**Table IV.1 Potential Energy Savings for Air-Cooled, Three-phase, Split-system, Less Than 65,000 Btu/h Air Conditioners and Heat Pumps**

	Split-System, Air Conditioner		Split System, Heat Pump	
Site Energy Savings Estimate				
	ASHRAE Efficiency Level	Quads	ASHRAE Efficiency Level	Quads
Level 0– ASHRAE	13.4 SEER2	0.0007	14.3 SEER2 7.5 HSPF2	0.0017
Primary Energy Savings Estimate				
Level 0– ASHRAE	13.4 SEER2	0.0017	14.3 SEER2 7.5 HSPF2	0.0044
FFC Energy Savings Estimate				
Level 0– ASHRAE	13.4 SEER2	0.0018	14.3 SEER2 7.5 HSPF2	0.0047

The significance of energy savings offered by a new or amended energy conservation standard cannot be determined without knowledge of the specific circumstances surrounding a given rulemaking. 86 FR 70892, 70901 (Dec. 13, 2021). Additionally, some covered products and equipment have most of their energy consumption occur during periods of peak energy demand. The impacts of these

products on the energy infrastructure can be more pronounced than products with relatively constant demand. In evaluating the significance of energy savings, DOE considers differences in primary energy and FFC effects for different covered products and equipment when determining whether energy savings are significant. Primary energy and FFC effects include the energy consumed in electricity production (depending on load shape), in distribution and transmission, and in extracting, processing, and transporting primary fuels (*i.e.*, coal, natural gas, petroleum fuels), and thus present a more complete picture of the impacts of energy conservation standards.

DOE conducted an analysis of the emissions reductions at the ASHRAE efficiency level for air-cooled, three-phase, split-system, less than 65,000 Btu/h air conditioners and air-cooled, three-phase, split-system, less than 65,000 Btu/h heat pumps. This emissions analysis consists of two components. The first component estimates the effect of potential energy conservation standards on power sector combustion emissions of CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, and Hg. The second component estimates the impacts of potential standards on emissions of two additional greenhouse gases, CH<sub>4</sub> and N<sub>2</sub>O, as well as the reductions to emissions of other gases due to “upstream” activities in the fuel production chain. These upstream activities comprise extraction, processing, and transporting fuels to the site of combustion. Table IV.2 displays the emissions reductions estimates for the power sector, the upstream sector, and the full-fuel-cycle.

**Table IV.2 Potential Emissions Savings for Air-Cooled, Three-phase, Split-system, Less than 65,000 Btu/h Air Conditioners and Heat Pumps**

	Split System, Air Conditioner	Split System, Heat Pump
	ASHRAE Efficiency Level	ASHRAE Efficiency Level

<b>Power Sector Emissions</b>		
CO <sub>2</sub> ( <i>million metric tons</i> )	0.1	0.2
CH <sub>4</sub> ( <i>thousand tons</i> )	0.0	0.0
N <sub>2</sub> O ( <i>thousand tons</i> )	0.0	0.0
SO <sub>2</sub> ( <i>thousand tons</i> )	0.0	0.1
NO <sub>x</sub> ( <i>thousand tons</i> )	0.0	0.1
Hg ( <i>tons</i> )	0.0	0.0
<b>Upstream Emissions</b>		
CO <sub>2</sub> ( <i>million metric tons</i> )	0.0	0.0
CH <sub>4</sub> ( <i>thousand tons</i> )	0.5	1.2
N <sub>2</sub> O ( <i>thousand tons</i> )	0.0	0.0
SO <sub>2</sub> ( <i>thousand tons</i> )	0.0	0.0
NO <sub>x</sub> ( <i>thousand tons</i> )	0.1	0.2
Hg ( <i>tons</i> )	0.0	0.0
<b>Total FFC Emissions</b>		
CO <sub>2</sub> ( <i>million metric tons</i> )	0.1	0.2
CH <sub>4</sub> ( <i>thousand tons</i> )	0.5	1.2
N <sub>2</sub> O ( <i>thousand tons</i> )	0.0	0.0
SO <sub>2</sub> ( <i>thousand tons</i> )	0.0	0.1
NO <sub>x</sub> ( <i>thousand tons</i> )	0.1	0.3
Hg ( <i>tons</i> )	0.0	0.0

In January 2023, ASHRAE published ASHRAE 90.1-2022, which updates the efficiency metrics for three-phase, less than 65,000 Btu/h VRF to be in terms of SEER2 and HSPF2. ASHRAE 90.1-2022 also updates the test procedure for three-phase, less than 65,000 Btu/h VRF to reference AHRI 210/240-2023. ASHRAE 90.1-2022 includes SEER2/HSPF2 levels for three-phase, less than 65,000 Btu/h VRF that are more stringent than the existing Federal standards.

With the release of ASHRAE 90.1-2022, DOE is triggered by the EPCA requirement to adopt amended standards at the new ASHRAE efficiency level. (42 U.S.C. 6313(a)(6)(A)(ii)) Because there are no models of three-phase, less than 65,000 Btu/h VRF currently on the market, DOE finds that no there would be no potential energy savings associated with adopting those efficiency levels in ASHRAE 90.1-2022, and thus no energy savings analysis was conducted.

## V. Conclusions

### A. More Stringent Efficiency Levels

As discussed, ASHRAE 90.1-2019 includes efficiency levels more stringent than the current Federal standards for three-phase, split-system, less than 65,000 Btu/h

ACUACs and ACUHPs, and ASHRAE 90.1-2022 includes efficiency levels more stringent than the current Federal standards for three-phase, less than 65,000 Btu/h VRF. When triggered by an update to ASHRAE Standard 90.1, EPCA requires DOE to establish an amended uniform national standard for equipment classes at the minimum level specified in the amended ASHRAE Standard 90.1 unless DOE determines, by rule published in the *Federal Register*, and supported by clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended ASHRAE Standard 90.1 for the equipment class would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)(I)-(II)) As noted previously, clear and convincing evidence is a heightened standard, and would only be met where the Secretary has an abiding conviction, based on available facts, data, and DOE's own analyses, that it is highly probable an amended standard would result in a significant additional amount of energy savings, and is technologically feasible and economically justified. *See American Public Gas Association v. U.S. Dep't of Energy*, No. 20-1068, 2022 WL 151923, at \*4 (D.C. Cir. January 18, 2022) (citing *Colorado v. New Mexico*, 467 U.S. 310, 316, 104 S.Ct. 2433, 81 L.Ed.2d 247 (1984)).

In the March 2022 NOPR, DOE did not consider more stringent efficiency levels than those in ASHRAE 90.1-2019, as this would require DOE to crosswalk the entire market for this equipment. 87 FR 18290, 18301-18303. The amended levels in ASHRAE 90.1-2019 rely on updated metrics (SEER2 and HSPF2), which were not applicable until 2023. Furthermore, the single-phase market, which is nearly identical to three-phase equipment, did not begin to use SEER2 and HSPF2 until 2023. Single-phase and three-phase models generally are manufactured on the same production lines and are physically identical to their corresponding single-phase central air conditioner and central air conditioning heat pump models except the former have three-phase electrical systems

and use components, primarily motors and compressors, that are designed for three-phase power input. 87 FR 77298, 77303. The amended levels for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs in ASHRAE 90.1-2019 are the same efficiency levels that will be required for single-phase air conditioners and heat pumps in 2023. (*See* 10 CFR 430.32(c)(5)). Given that the standard levels of three-phase, less than 65,000 Btu/h ACUACs and ACUHPs are in terms of updated SEER2 and HSPF2 metrics for the first time, public databases that encompass the full range of efficiency ratings in terms of the updated metrics for these three-phase, less than 65,000 Btu/h equipment do not exist yet.

As previously stated, EPCA asserts that for DOE to adopt a standard more stringent than an amended ASHRAE 90.1 standard, DOE must support its decision with clear and convincing evidence. In the March 2022 NOPR, DOE determined that the lack of market data for the amended efficiency metric creates substantial doubt in any analysis of energy savings that would result from efficiency levels more stringent than those in ASHRAE 90.1-2019. 87 FR 18290, 18302. Therefore, DOE did not conduct any analysis of energy savings from more stringent standards for the two triggered classes of three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs. DOE did not receive any comments in response to the March 2022 NOPR suggesting that DOE conduct such an analysis.

ASHRAE 90.1-2022 includes SEER2/HSPF2 levels for three-phase, less than 65,000 Btu/h VRF that are more stringent than the existing Federal standards, as stated previously. In the March 2022 NOPR, DOE noted that if ASHRAE finalized a future version of ASHRAE 90.1 that (1) publishes prior to DOE publishing a final rule for amended energy conservation standards for three-phase, less than 65,000 Btu/h VRF and (2) includes SEER2/HSPF2 levels for three-phase, less than 65,000 Btu/h VRF that are more stringent than the existing federal standards, DOE would adopt those levels in a final rule. *Id.* at 87 FR 18304. DOE requested comment on this proposal.



CA IOUs, Carrier, and Lennox all commented in support of adopting the more stringent SEER2/HSPF2 efficiency levels for three-phase, less than 65,000 Btu/h VRF as proposed in the ASHRAE 90.1-2019 Addendum 'ay', should such levels be incorporated into an updated version of ASHRAE 90.1. (CA IOUs, No. 8, p. 3; Carrier, No. 6, p. 2; Lennox, No. 7, p. 2)

Because there are no models of three-phase, less than 65,000 Btu/h VRF currently on the market, DOE finds that there would be no potential energy savings associated with adopting even more stringent efficiency levels than those in ASHRAE 90.1-2022, and thus DOE did not consider more stringent efficiency levels.

#### *B. Review Under Six Year Lookback*

As discussed, DOE is required to conduct an evaluation of each class of covered equipment in ASHRAE Standard 90.1 every six years. (42 U.S.C. 6313(a)(6)(C)(i)) Accordingly, in this document, DOE has also evaluated the three-phase, less than 65,000 Btu/h equipment for which ASHRAE 90.1-2019 did not increase the stringency of the standards: (1) three-phase, single-package, less than 65,000 Btu/h ACUACs and ACUHPs; (2) S-C, three-phase, less than 65,000 Btu/h ACUACs and ACUHPs; and (3) SDHV, three-phase, less than 65,000 Btu/h ACUACs and ACUHPs.

As discussed in section III.B.2 of this final rule, DOE has concluded that there are no models on the market in the equipment classes of: (1) S-C, three-phase, less than 65,000 Btu/h ACUACs and ACUHPs; and (2) SDHV, three-phase, less than 65,000 Btu/h ACUACs and ACUHPs. Therefore, there would be no potential energy savings associated with more stringent standards for these classes, and DOE did not conduct further analyses of more stringent standards for these classes.

For three-phase, single package, less than 65,000 Btu/h ACUACs and ACUHPs, similar to the triggered classes discussed in sections V.A and V.B of this document (*i.e.*, three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs and three-

phase, less than 65,000 Btu/h VRF), there are limited SEER2 and HSPF2 data for models of varying efficiencies, and there is not a comparable industry analysis (*i.e.*, translating ratings to the updated metric for these models on the market) for comparison. The market-wide analysis necessary to evaluate whether amended standards would result in significant energy savings and be technologically feasible and economically justified under the “clear and convincing” threshold would require more than baseline data.

Therefore, in line with the same reasoning presented in the March 2022 NOPR (*See* 87 FR 18290), DOE determines that the “clear and convincing” threshold is not met for three-phase, single-package, less than 65,000 Btu/h ACUACs and ACUHPs. As such, DOE did not conduct an energy savings analysis of standard levels more stringent than the current Federal standard levels for three-phase, single package, less than 65,000 Btu/h ACUACs and ACUHPs not triggered by ASHRAE 90.1-2019.

#### *C. Definitions for Space-Constrained and Small-Duct, High-Velocity Equipment*

ASHRAE 90.1-2019 includes S-C and SDHV equipment classes for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs. In the March 2022 NOPR, DOE proposed to adopt separate standards for S-C, split-system, and single-package ACUACs and ACUHPs and SDHV ACUACs and ACUHPs. 87 FR 18290, 18304. Along with the proposed standards, DOE proposed the following definitions for “small-duct, high-velocity commercial package air conditioning and heating equipment” and “space-constrained commercial package and heating equipment” at 10 CFR 431.92. *Id.* The two definitions proposed in the March 2022 NOPR align with the definitions specified in 10 CFR 430.2 for single-phase CAC/HPs, which, as discussed in section V.A of this document, are identical to three-phase products except for the power input.

*Small-duct, High-velocity Commercial Package Air Conditioning and Heating Equipment* means a basic model of commercial package, split-system air conditioning and heating equipment that: has a rated cooling capacity no greater than 65,000 Btu/h; is

air-cooled; and is paired with an indoor unit that (1) includes an indoor blower housed with the coil; (2) is designed for, and produces, at least 1.2 inches of external static pressure when operated at the certified air volume rate of 220-350 CFM per rated ton cooling in the highest default cooling airflow-controls setting; and (3) when applied in the field, uses high velocity room outlets generally greater than 1,000 fpm that have less than 6.0 square inches of free area.

*Space-constrained Commercial Package Air Conditioning and Heating*

*Equipment* means a basic model of commercial package air conditioning and heating equipment (packaged or split) that: (1) is air-cooled; (2) has a rated cooling capacity no greater than 30,000 Btu/h; (3) has an outdoor or indoor unit having at least two overall exterior dimensions or an overall displacement that: (i) is substantially smaller than those of other units that are: (A) currently usually installed in site-built single-family homes; and (B) of a similar cooling, and, if a heat pump, heating capacity; and (ii) if increased, would certainly result in a considerable increase in the usual cost of installation or would certainly result in a significant loss in the utility of the product to the consumer; and (3) of a product type that was available for purchase in the United States as of December 1, 2000.

In its response to the March 2022 NOPR, CA IOUs suggested clarifying modifications to the definitions of S-C and SDHV ACUACs and ACUHPs. (CA IOUs, No. 8 at pp. 1-2) CA IOUs' first suggestion proposed adding "is powered by three-phase current" to definitions for both S-C and SDHV ACUACs and ACUHPs. (*Id.* at p. 2) CA IOUs' second suggestion proposed adding "is not a single package vertical air conditioner (SPVAC) or a single package vertical heat pump (SPVHP)" from the definition for S-C ACUACs and ACUHPs. (*Id.*)

In this final rule, DOE has decided to include the clarification suggestions made in the CA IOUs' response to the March 2022 NOPR to prevent confusion about

applicable equipment. As a result, DOE is adopting the following definitions for “small-duct, high-velocity commercial package air conditioning and heating equipment” and “space-constrained commercial package and heating equipment” at 10 CFR 431.92 in this final rule.

*Small-duct, High-velocity Commercial Package Air Conditioning and Heating Equipment* means a basic model of commercial package, split-system air conditioning and heating equipment that: (1) has a rated cooling capacity no greater than 65,000 Btu/h; (2) is powered by three-phase current; (3) is air-cooled; and (4) is paired with an indoor unit that (i) includes an indoor blower housed with the coil; (ii) is designed for, and produces, at least 1.2 inches of external static pressure when operated at the certified air volume rate of 220-350 CFM per rated ton cooling in the highest default cooling airflow-controls setting; and (iii) when applied in the field, uses high velocity room outlets generally greater than 1,000 fpm that have less than 6.0 square inches of free area.

*Space-constrained Commercial Package Air Conditioning and Heating Equipment* means a basic model of commercial package air conditioning and heating equipment (packaged or split) that: (1) is air-cooled; (2) is powered by three-phase current; (3) is not a single package vertical air conditioner or a single package vertical heat pump; (4) has a rated cooling capacity no greater than 30,000 Btu/h; (5) has an outdoor or indoor unit having at least two overall exterior dimensions or an overall displacement that: (i) is substantially smaller than those of other units that are: (A) currently usually installed in site-built single-family homes; and (B) of a similar cooling, and, if a heat pump, heating capacity; and (ii) if increased, would certainly result in a considerable increase in the usual cost of installation or would certainly result in a significant loss in the utility of the product to the consumer; and (6) of a product type that was available for purchase in the United States as of December 1, 2000.

## *D. Energy Conservation Standards*

### 1. Standard Levels

In this final rule, DOE is amending energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and for three-phase, less than 65,000 Btu/h VRF. The amended energy conservation standards are in terms of SEER2 and HSPF2, which would align with the efficiency metrics specified in ASHRAE 90.1-2019 for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and ASHRAE 90.1-2022 for three-phase, less than 65,000 Btu/h VRF and with the updated industry test procedure AHRI 210/240-2023.

DOE is amending energy conservation standards to be in terms of SEER2 and HSPF2 that generally align with the standard levels in ASHRAE 90.1 for three-phase equipment with some exceptions. For three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs, DOE is amending standards to align with the more stringent levels in ASHRAE 90.1-2019. For three-phase, less than 65,000 Btu/h VRF, DOE is amending standards to align with the more stringent levels in ASHRAE 90.1-2022. For three-phase, single-package, less than 65,000 Btu/h ACUACs and ACUHPs, DOE is amending standards to align with the levels in ASHRAE 90.1-2019, which maintain equivalent stringency to the current Federal standards. For S-C split-system and single-package ACUACs and ACUHPs and SDHV ACUACs and ACUHPs, DOE is adopting standards that differ from the values specified in ASHRAE 90.1-2019. These standards are equivalent stringency to the current Federal standards but are translated to the new metrics SEER2 and HSPF2. The adopted standards are presented in Table I.1 and Table I.2 of this document.

### 2. Compliance Date

In the March 2022 NOPR, DOE proposed a standards compliance date of January 1, 2025, for all classes of three-phase, less than 65,000 Btu/h equipment. 87 FR 18290,

18304-18305. DOE understands that this compliance date is unaligned with the January 1, 2023 compliance date of amended SEER2 and HSPF2 standards for corresponding single-phase products. As discussed in the March 2022 NOPR, DOE reiterates that, while there may be benefits to aligning the compliance dates for SEER2 and HSPF2 standards between single-phase products and three-phase equipment, DOE cannot prescribe a compliance date for amended standards that would violate its obligations under EPCA. *Id.* at 87 FR 18305. EPCA requires that DOE specify a compliance date no earlier than 2 years after the compliance date specified in ASHRAE Standard 90.1 for triggered classes of three-phase, less than 65,000 Btu/h ACUAC, ACUHP, and VRF equipment. *Id.* As a result, to provide a consistent compliance date for standards in terms of SEER2 and HSPF2 for all three-phase, less than 65,000 Btu/h equipment, the amended standards in this final rule apply to all three-phase, less than 65,000 Btu/h equipment that is manufactured on or after January 1, 2025.

## **VI. Procedural Issues and Regulatory Review**

### *A. Review Under Executive Orders 12866 and 13563*

Executive Order (E.O.)12866, “Regulatory Planning and Review,” as supplemented and reaffirmed by E.O. 13563, “Improving Regulation and Regulatory Review, 76 FR 3821 (Jan. 21, 2011), requires agencies, to the extent permitted by law, to (1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather

than specifying the behavior or manner of compliance that regulated entities must adopt; and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public. DOE emphasizes as well that E.O. 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, this final regulatory action is consistent with these principles.

Section 6(a) of E.O. 12866 also requires agencies to submit “significant regulatory actions” to OIRA for review. OIRA has determined that this final regulatory action does not constitute a “significant regulatory action” under section 3(f) of E.O. 12866. Accordingly, this action was not submitted to OIRA for review under E.O. 12866.

#### *B. Review Under the Regulatory Flexibility Act*

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires preparation of an initial regulatory flexibility analysis (IRFA) and a final regulatory flexibility analysis (FRFA) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by E.O. 13272, “Proper Consideration of Small Entities in Agency Rulemaking,” 67 FR 53461 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General

Counsel's website ([www.energy.gov/gc/office-general-counsel](http://www.energy.gov/gc/office-general-counsel)). DOE has prepared the following FRFA for the products that are the subject of this rulemaking.

The following sections detail DOE's FRFA for this energy conservation standards rulemaking.

## 1. Description of Reasons Why Action Is Being Considered

DOE is amending the existing Federal energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF. EPCA requires DOE to consider amending the existing Federal energy conservation standards for certain types of listed commercial and industrial equipment (generally, commercial water heaters, commercial packaged boilers, commercial air conditioning and heating equipment, and packaged terminal air conditioners and heat pumps) each time ASHRAE Standard 90.1 is amended with respect to such equipment. (42 U.S.C. 6313(a)(6)(A)) For each type of equipment, EPCA directs that if ASHRAE Standard 90.1 is amended, DOE must adopt amended energy conservation standards at the new efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more stringent efficiency level as a national standard would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) This is referred to as "the ASHRAE trigger." DOE must also review and determine whether to amend standards of each class of covered equipment in ASHRAE Standard 90.1 every 6 years. (42 U.S.C. 6313(a)(6)(C)(i)).

## 2. Objectives of, and Legal Basis for, Rule

EPCA requires DOE to consider amending the existing Federal energy conservation standards each time ASHRAE Standard 90.1 is amended with respect to such equipment. (42 U.S.C. 6313(a)(6)(A)) ASHRAE officially released ASHRAE 90.1-2019 in October 2019, thereby triggering DOE's previously referenced obligations



to determine, for certain classes of three-phase, less than 65,000 Btu/h ACUAC, ACUHP, and VRF equipment, whether: (1) the amended industry standard levels should be adopted; or (2) clear and convincing evidence exists to justify more-stringent standard levels. For any class where DOE was not triggered, the Department routinely considers those classes under EPCA's 6-year-lookback provision at the same time, to address the subject equipment in a comprehensive fashion.

### 3. Description on Estimated Number of Small Entities Regulated

For manufacturers of three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF, the Small Business Administration (SBA) has set a size threshold. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the proposed rule. *See* 13 CFR part 121. The equipment covered by this proposed rule is classified under North American Industry Classification System (NAICS) code 333415<sup>10</sup>, "Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing." In 13 CFR 121.201, the SBA sets a threshold of 1,250 employees or fewer for an entity to be considered as a small business for this category.

DOE reviewed the energy conservation standards adopted in this final rule under the provisions of the Regulatory Flexibility Act and the procedures and policies published on February 19, 2003. DOE relied on the Compliance Certification Database<sup>11</sup> in identifying manufacturers. For three-phase, less than 65,000 Btu/h ACUACs and ACUHPs, DOE identified seventeen original equipment manufacturers (OEMs) covered by this rulemaking. DOE did not identify any manufacturers of three-phase, less than 65,000 Btu/h VRF. Of those seventeen OEMs, DOE screened out companies that do not meet the definition of a "small business" or are foreign-owned and operated. DOE

---

<sup>10</sup> The size standards are listed by NAICS code and industry description and are available at: [www.sba.gov/document/support-table-size-standards](http://www.sba.gov/document/support-table-size-standards) (Last accessed on December 12, 2022).

<sup>11</sup> DOE's Compliance Certification Database is available at: [www.regulations.doe.gov/ccms](http://www.regulations.doe.gov/ccms).

identified four small, domestic OEMs for consideration. DOE used publicly available information and subscription-based market research tools (*e.g.*, reports from Dun & Bradstreet<sup>12</sup>) to determine headcount, revenue, and geographic presence of the small businesses. Of those four small OEMs, one is an AHRI member and three are not AHRI members.

In the March 2022 NOPR, DOE requested comment on its understanding of the current market accounted for by small manufacturers, as well as its understanding of the efficiency of the equipment offered by such manufacturers. 87 FR 18290, 18307. In its response, Carrier indicated that it did not have this requested information at the time. (Carrier, No. 6, p. 3) No other comments were received on this topic.

#### 4. Description and Estimate of Compliance Requirements Including Differences in Cost, if Any, for Different Groups of Small Entities

In this final rule, DOE:

- Adopts amended energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs corresponding to the minimum efficiency levels in ASHRAE 90.1-2019. The levels are in terms of new metrics seasonal energy efficiency ratio-2 (SEER2) and heating seasonal performance factor-2 (HSPF2);
- Separates energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs further into: (1) three-phase, S-C, commercial split-system air conditioners (S-C ACUACs); (2) three-phase, S-C, commercial split-system heat pumps (S-C ACUHPs); (3) S-C single-package ACUACs; (4) S-C single-package ACUHPs; (5) three-phase, SDHV commercial air conditioners (SDHV ACUACs); and (6) three-phase, SDHV commercial heat pumps (SDHV ACUHPs). These

---

<sup>12</sup> Dun & Bradstreet reports are available at [app.dnbhoovers.com](http://app.dnbhoovers.com).

additional equipment classes are included in ASHRAE 90.1-2019 for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs; and

- Adopts amended energy conservations standards for three-phase, less than 65,000 Btu/h VRF corresponding to the minimum efficiency levels in ASHRAE 90.1-2022. The levels are in terms of new metrics seasonal energy efficiency ratio-2 (SEER2) and heating seasonal performance factor-2 (HSPF2)

For S-C ACUACs and ACUHPs and SDHV ACUACs and ACUHPs, the current applicable Federal standards are more stringent than the ASHRAE 90.1-2019 levels. To avoid backsliding (as required by EPCA), DOE cannot adopt the ASHRAE 90.1-2019 levels for these classes and is therefore adopting standards for S-C ACUACs and ACUHPs and SDHV ACUACs and ACUHPs equipment in terms of SEER2 and HSPF2 that maintain equivalent stringency to the applicable current Federal standards (in terms of SEER and HSPF). Of note, DOE has concluded that there are no models of S-C ACUACs and ACUHPs and SDHV ACUACs and ACUHPs on the market.

For three-phase, single-package, less than 65,000 Btu/h ACUACs and ACUHPs, the ASHRAE 90.1-2019 levels are of equivalent stringency to the current Federal standards. Therefore, DOE's adoption of standards in terms of the new metrics SEER2 and HSPF2 that are crosswalked from the current Federal standards would not increase the stringency of standards.

ASHRAE 90.1-2022 includes minimum efficiency levels for three-phase, less than 65,000 Btu/h VRF that are more stringent than the current Federal standards. DOE must adopt amended standards at the amended ASHRAE efficiency levels unless DOE determines, supported by clear and convincing evidence, that adoption of a more stringent standard would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii).

Because DOE has made no such determination, this final rule adopts amended standards at the amended ASHRAE efficiency levels for three-phase, less than 65,000 Btu/h VRF.

ASHRAE 90.1-2019 includes minimum efficiency levels for three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs that are more stringent than the current Federal standards. DOE must adopt amended standards at the amended ASHRAE efficiency levels unless DOE determines, supported by clear and convincing evidence, that adoption of a more stringent standard would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)). Because DOE has made no such determination, this final rule adopts amended standards at the amended ASHRAE efficiency levels for three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs.

In estimating the impact to small manufacturers, DOE recognizes that manufacturers may incur conversion costs as a result of the amended standards for three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs. In reviewing all commercially available models of three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs in DOE's Compliance Certification Database, the four small manufacturers account for 30 percent of model offerings. For each of the four small manufacturers, approximately 58 percent of the companies' current models would meet the adopted levels. For the current models that do not meet the adopted levels, the small manufacturers would need to either discontinue or redesign non-compliant models. However, adoption of standards at least as stringent as the ASHRAE levels is required under EPCA; furthermore, adopting standards above ASHRAE levels (DOE's only other option under 42 U.S.C. 6313(a)(6)(A)(ii)) would lead to an even greater portion of small manufacturer models requiring redesign. Therefore, DOE has determined that the adopted efficiency level provides the least cost option for small manufacturers.

## 5. Duplication, Overlap, and Conflict with Other Rules and Regulations

DOE is not aware of any rules or regulations that duplicate, overlap, or conflict with this final rule.

## 6. Significant Alternatives to the Rule

As EPCA requires DOE to either adopt the ASHRAE levels or to adopt higher standards, DOE is limited in options to mitigate impacts to small businesses from the more stringent ASHRAE Standard 90.1 levels. DOE's adoption of the more stringent levels in ASHRAE 90.1-2019 for three-phase, split-system, less than 65,000 Btu/h ACUACs and ACUHPs is the least cost option to industry.

Manufacturers subject to DOE's energy efficiency standards may apply to DOE's Office of Hearings and Appeals for exception relief under certain circumstances. Manufacturers should refer to 10 CFR part 1003 for additional details.

### *C. Review Under the Paperwork Reduction Act*

Manufacturers of three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF must certify to DOE that their products comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their products according to the DOE test procedures for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF. (See generally 10 CFR part 429). The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB control number 1910-1400. Public reporting burden for the certification is

estimated to average 35 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

#### *D. Review Under the National Environmental Policy Act of 1969*

Pursuant to the National Environmental Policy Act of 1969 (NEPA), DOE has analyzed this proposed action rule in accordance with NEPA and DOE's NEPA implementing regulations (10 CFR part 1021). DOE has determined that this rule qualifies for categorical exclusion under 10 CFR part 1021, subpart D, appendix B5.1 because it is a rulemaking that establishes energy conservation standards for consumer products or industrial equipment, none of the exceptions identified in B5.1(b) apply, no extraordinary circumstances exist that require further environmental analysis, and it meets the requirements for application of a categorical exclusion. *See* 10 CFR 1021.410. Therefore, DOE has determined that promulgation of this final rule is not a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA and does not require an environmental assessment or an environmental impact statement.

#### *E. Review Under Executive Order 13132*

E.O. 13132, "Federalism," 64 FR 43255 (Aug. 10, 1999), imposes certain requirements on Federal agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity

for such actions. The Executive order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this final rule and has determined that it would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the equipment that are the subject of this final rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297) Therefore, no further action is required by Executive Order 13132.

*F. Review Under Executive Order 12988*

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of E.O. 12988, “Civil Justice Reform,” imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity, (2) write regulations to minimize litigation, (3) provide a clear legal standard for affected conduct rather than a general standard, and (4) promote simplification and burden reduction. 61 FR 4729 (Feb. 7, 1996). Regarding the review required by section 3(a), section 3(b) of E.O. 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation (1) clearly specifies the preemptive effect, if any, (2) clearly specifies any effect on existing Federal law or regulation, (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction, (4) specifies the retroactive effect, if any, (5) adequately defines key terms, and (6) addresses other important issues affecting clarity

and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of E.O. 12988 requires Executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this final rule meets the relevant standards of E.O. 12988.

*G. Review Under the Unfunded Mandates Reform Act of 1995*

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. 104-4, sec. 201 (codified at 2 U.S.C. 1531). For a regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of \$100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a “significant intergovernmental mandate,” and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect them. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE’s policy statement is also available at [www.energy.gov/sites/prod/files/gcprod/documents/umra\\_97.pdf](http://www.energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf).

This final rule does not contain a Federal intergovernmental mandate, nor is it expected to require expenditures of \$100 million or more in any one year by the private sector. As a result, the analytical requirements of UMRA do not apply.



#### *H. Review Under the Treasury and General Government Appropriations Act, 1999*

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This final rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

#### *I. Review Under Executive Order 12630*

Pursuant to E.O. 12630, “Governmental Actions and Interference with Constitutionally Protected Property Rights,” 53 FR 8859 (March 18, 1988), DOE has determined that this final rule would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

#### *J. Review Under the Treasury and General Government Appropriations Act, 2001*

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516, note) provides for Federal agencies to review most disseminations of information to the public under information quality guidelines established by each agency pursuant to general guidelines issued by OMB. OMB’s guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE’s guidelines were published at 67 FR 62446 (Oct. 7, 2002). Pursuant to OMB Memorandum M-19-15, Improving Implementation of the Information Quality Act (April 24, 2019), DOE published updated guidelines which are available at

[www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf](http://www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf). DOE has reviewed this final rule under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

#### *K. Review Under Executive Order 13211*

E.O. 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OIRA at OMB, a Statement of Energy Effects for any significant energy action. A “significant energy action” is defined as any action by an agency that promulgates or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

DOE has concluded that this regulatory action, which sets forth amended energy conservation standards for three-phase, less than 65,000 Btu/h ACUACs and ACUHPs and three-phase, less than 65,000 Btu/h VRF, is not a significant energy action because the standards are not likely to have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as such by the Administrator at OIRA. Accordingly, DOE has not prepared a Statement of Energy Effects on this final rule.

#### *L. Information Quality*

On December 16, 2004, OMB, in consultation with the Office of Science and Technology Policy (OSTP), issued its Final Information Quality Bulletin for Peer Review (the Bulletin). 70 FR 2664 (Jan. 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government, including influential scientific information related to agency regulatory actions. The purpose of the Bulletin is to enhance the quality

and credibility of the Government’s scientific information. Under the Bulletin, the energy conservation standards rulemaking analyses are “influential scientific information,” which the Bulletin defines as “scientific information the agency reasonably can determine will have, or does have, a clear and substantial impact on important public policies or private sector decisions.” 70 FR 2664, 2667.

In response to OMB’s Bulletin, DOE conducted formal peer reviews of the energy conservation standards development process and the analyses that are typically used and prepared a report describing that peer review.<sup>13</sup> Generation of this report involved a rigorous, formal, and documented evaluation using objective criteria and qualified and independent reviewers to make a judgment as to the technical/scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects. Because available data, models, and technological understanding have changed since 2007, DOE has engaged with the National Academy of Sciences to review DOE’s analytical methodologies to ascertain whether modifications are needed to improve the Department’s analyses. DOE is in the process of evaluating the resulting report.<sup>14</sup>

#### *M. Congressional Notification*

As required by 5 U.S.C. 801, DOE will report to Congress on the promulgation of this rule prior to its effective date. The report will state that it has been determined that the rule is not a “major rule” as defined by 5 U.S.C. 804(2).

### **VII. Approval of the Office of the Secretary**

The Secretary of Energy has approved publication of this final rule.

---

<sup>13</sup> The 2007 “Energy Conservation Standards Rulemaking Peer Review Report” is available at: [www.energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report-0](http://www.energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report-0) (last accessed January 3, 2023).

<sup>14</sup> The report is available at [www.nationalacademies.org/our-work/review-of-methods-for-setting-building-and-equipment-performance-standards](http://www.nationalacademies.org/our-work/review-of-methods-for-setting-building-and-equipment-performance-standards)

## **List of Subjects in 10 CFR Part 431**

Administrative practice and procedure, Confidential business information, Energy conservation test procedures, and Reporting and recordkeeping requirements.

### **Signing Authority**

This document of the Department of Energy was signed on March 21, 2023, by Francisco Alejandro Moreno, Acting Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on May 9, 2023.

Treena V. Garrett  
Federal Register Liaison Officer,  
U.S. Department of Energy

For the reasons set forth in the preamble, DOE amends part 431 of chapter II, subchapter D, of title 10 of the Code of Federal Regulations as set forth below:

### **PART 431 – ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT**

1. The authority citation for part 431 continues to read as follows:

**Authority:** 42 U.S.C. 6291-6317; 28 U.S.C. 2461 note.

2. Section 431.92 is amended by adding, in alphabetical order, definitions for "Small-duct, high-velocity commercial package air conditioning and heating equipment" and "Space-constrained commercial package air conditioning and heating equipment" to read as follows:

**§431.92 Definitions concerning commercial air conditioners and heat pumps.**

\* \* \* \* \*

*Small-duct, high-velocity commercial package air conditioning and heating equipment* means a basic model of commercial package, split-system air conditioning and heating equipment that:

- (1) Has a rated cooling capacity no greater than 65,000 Btu/h;
- (2) Is powered by three-phase current;
- (3) Is air-cooled; and
- (4) Is paired with an indoor unit that:
  - (i) Includes an indoor blower housed with the coil;
  - (ii) Is designed for, and produces, at least 1.2 inches of external static pressure when operated at the certified air volume rate of 220-350 CFM per rated ton cooling in the highest default cooling airflow-controls setting; and
  - (iii) When applied in the field, uses high velocity room outlets generally greater than 1,000 fpm that have less than 6.0 square inches of free area.

\* \* \* \* \*

*Space-constrained commercial package air conditioning and heating equipment* means a basic model of commercial package air conditioning and heating equipment (packaged or split) that:

- (1) Is air-cooled;
- (2) Is powered by three-phase current;

(3) Is not a single package vertical air conditioner or a single package vertical heat pump;

(4) Has a rated cooling capacity no greater than 30,000 Btu/h;

(5) Has an outdoor or indoor unit having at least two overall exterior dimensions or an overall displacement that:

(i) Is substantially smaller than those of other units that are:

(A) Currently usually installed in site-built single-family homes; and

(B) Of a similar cooling, and, if a heat pump, heating capacity; and

(ii) If increased, would certainly result in a considerable increase in the usual cost of installation or would certainly result in a significant loss in the utility of the product to the consumer; and

(6) Of a product type that was available for purchase in the United States as of December 1, 2000.

\* \* \* \* \*

3. Section 431.97 is amended by:

a. In paragraph (a), removing the text “(f)” and adding, in its place the text “(h)”;  
and

b. In paragraph (b) revising tables 1 through 4;

c. In paragraph (f), revising table 13; and

d. Adding paragraph (h).

The revisions and addition read as follows:

**§431.97 Energy efficiency standards and their compliance dates.**

\*\*\*\*\*

(b) \* \* \*

**Table 1 to §431.97(b)—Minimum Cooling Efficiency Standards for Air Conditioning and Heating Equipment**

[Not including single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow multi-split air conditioners and heat pumps, and double-duct air-cooled commercial package air conditioning and heating equipment]

Equipment type	Cooling capacity	Subcategory	Heating type	Efficiency Level	Compliance date: Equipment manufactured starting on...
Small Commercial Package Air Conditioning and Heating Equipment (Air-Cooled)	≥65,000 Btu/h and <135,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 11.2	January 1, 2010. <sup>1</sup>
			All Other Types of Heating	EER = 11.0	January 1, 2010. <sup>1</sup>
		HP	No Heating or Electric Resistance Heating	EER = 11.0	January 1, 2010. <sup>1</sup>
			All Other Types of Heating	EER = 10.8	January 1, 2010. <sup>1</sup>
Large Commercial Package Air Conditioning and Heating Equipment (Air-Cooled)	≥135,000 Btu/h and <240,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 11.0	January 1, 2010. <sup>1</sup>
			All Other Types of Heating	EER = 10.8	January 1, 2010. <sup>1</sup>
		HP	No Heating or Electric Resistance Heating	EER = 10.6	January 1, 2010. <sup>1</sup>
			All Other Types of Heating	EER = 10.4	January 1, 2010. <sup>1</sup>
Very Large Commercial Package Air Conditioning and Heating Equipment (Air-Cooled)	≥240,000 Btu/h and <760,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 10.0	January 1, 2010. <sup>1</sup>
			All Other Types of Heating	EER = 9.8	January 1, 2010. <sup>1</sup>
		HP	No Heating or Electric Resistance Heating	EER = 9.5	January 1, 2010. <sup>1</sup>
			All Other Types of Heating	EER = 9.3	January 1, 2010. <sup>1</sup>

Small Commercial Package Air Conditioning and Heating Equipment (Water-Cooled)	<65,000 Btu/h	AC	All	EER = 12.1	October 29, 2003.
	≥65,000 Btu/h and <135,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 12.1	June 1, 2013.
			All Other Types of Heating	EER = 11.9	June 1, 2013.
Large Commercial Package Air Conditioning and Heating Equipment (Water-Cooled)	≥135,000 Btu/h and <240,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 12.5	June 1, 2014.
			All Other Types of Heating	EER = 12.3	June 1, 2014.
Very Large Commercial Package Air Conditioning and Heating Equipment (Water-Cooled)	≥240,000 Btu/h and <760,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 12.4	June 1, 2014.
			All Other Types of Heating	EER = 12.2	June 1, 2014.
Small Commercial Package Air Conditioning and Heating Equipment (Evaporatively-Cooled)	<65,000 Btu/h	AC	All	EER = 12.1	October 29, 2003.
	≥65,000 Btu/h and <135,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 12.1	June 1, 2013.
			All Other Types of Heating	EER = 11.9	June 1, 2013.
Large Commercial Package Air Conditioning and Heating Equipment (Evaporatively-Cooled)	≥135,000 Btu/h and <240,000 Btu/h	AC	No Heating or Electric Resistance Heating	EER = 12.0	June 1, 2014.
			All Other Types of Heating	EER = 11.8	June 1, 2014.



Very Large Commercial Package Air Conditioning and Heating Equipment (Evaporatively-Cooled)	$\geq 240,000$ Btu/h and $< 760,000$ Btu/h	AC	No Heating or Electric Resistance Heating	EER = 11.9	June 1, 2014.
			All Other Types of Heating	EER = 11.7	June 1, 2014.
Small Commercial Package Air-Conditioning and Heating Equipment (Water-Source: Water-to-Air, Water-Loop)	$< 17,000$ Btu/h	HP	All	EER = 11.2	October 29, 2003. <sup>2</sup>
	$\geq 17,000$ Btu/h and $< 65,000$ Btu/h	HP	All	EER = 12.0	October 29, 2003. <sup>2</sup>
	$\geq 65,000$ Btu/h and $< 135,000$ Btu/h	HP	All	EER = 12.0	October 29, 2003. <sup>2</sup>

<sup>1</sup> And manufactured before January 1, 2018. See Table 3 of this section for updated efficiency standards.

<sup>2</sup> And manufactured before October 9, 2015. See Table 3 of this section for updated efficiency standards.

## Table 2 to §431.97(b)—Minimum Heating Efficiency Standards for Air

### Conditioning and Heating Equipment [Heat Pumps]

[Not including single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow multi-split air conditioners and heat pumps, and double-duct air-cooled commercial package air conditioning and heating equipment]

Equipment type	Cooling capacity	Efficiency level	Compliance Date: Equipment manufactured starting on...
Small Commercial Package Air Conditioning and Heating Equipment (Air-Cooled)	$\geq 65,000$ Btu/h and $< 135,000$ Btu/h	COP = 3.3	January 1, 2010. <sup>1</sup>
Large Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	$\geq 135,000$ Btu/h and $< 240,000$ Btu/h	COP = 3.2	January 1, 2010. <sup>1</sup>
Very Large Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	$\geq 240,000$ Btu/h and $< 760,000$ Btu/h	COP = 3.2	January 1, 2010. <sup>1</sup>
Small Commercial Package Air Conditioning and Heating Equipment (Water-Source: Water-to-Air, Water-Loop)	$< 135,000$ Btu/h	COP = 4.2	October 29, 2003. <sup>2</sup>

<sup>1</sup> And manufactured before January 1, 2018. See Table 4 of this section for updated efficiency standards.

<sup>2</sup> And manufactured before October 9, 2015. See Table 4 of this section for updated efficiency standards.

**Table 3 to §431.97(b)—Updates to the Minimum Cooling Efficiency Standards for Air Conditioning and Heating Equipment**

[Not including single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow multi-split air conditioners and heat pumps, and double-duct air-cooled commercial package air conditioning and heating equipment]

Equipment type	Cooling capacity	Subcategory	Heating type	Efficiency Level	Compliance date: Equipment manufactured starting on...
Small Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	≥65,000 Btu/h and <135,000 Btu/h	AC	Electric Resistance Heating or No Heating	IEER = 12.9 IEER = 14.8	January 1, 2018. <sup>1</sup> January 1, 2023.
			All Other Types of Heating	IEER = 12.7 IEER = 14.6	January 1, 2018. <sup>1</sup> January 1, 2023.
		HP	Electric Resistance Heating or No Heating	IEER = 12.2 IEER = 14.1	January 1, 2018. <sup>1</sup> January 1, 2023.
			All Other Types of Heating	IEER = 12.0 IEER = 13.9	January 1, 2018. <sup>1</sup> January 1, 2023.
Large Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	≥135,000 Btu/h and <240,000 Btu/h	AC	Electric Resistance Heating or No Heating	IEER = 12.4 IEER = 14.2	January 1, 2018. <sup>1</sup> January 1, 2023.
			All Other Types of Heating	IEER = 12.2 IEER = 14.0	January 1, 2018. <sup>1</sup> January 1, 2023.
		HP	Electric Resistance Heating or No Heating	IEER = 11.6 IEER = 13.5	January 1, 2018. <sup>1</sup> January 1, 2023.
			All Other Types of Heating	IEER = 11.4 IEER = 13.3	January 1, 2018. <sup>1</sup> January 1, 2023.
Very Large Commercial Packaged Air Conditioning and	≥240,000 Btu/h and <760,000 Btu/h	AC	Electric Resistance Heating or	IEER = 11.6 IEER = 13.2	January 1, 2018. <sup>1</sup> January 1, 2023.

Heating Equipment (Air-Cooled)			No Heating		
			All Other Types of Heating	IEER = 11.4 IEER = 13.0	January 1, 2018. <sup>1</sup> January 1, 2023.
		HP	Electric Resistance Heating or No Heating	IEER = 10.6 IEER = 12.5	January 1, 2018. <sup>1</sup> January 1, 2023.
			All Other Types of Heating	IEER = 10.4 IEER = 12.3	January 1, 2018. <sup>1</sup> January 1, 2023.
Small Commercial Packaged Air-Conditioning and Heating Equipment (Water-Source: Water-to-Air, Water-Loop)	<17,000 Btu/h	HP	All	EER = 12.2	October 9, 2015.
	≥17,000 Btu/h and <65,000 Btu/h	HP	All	EER = 13.0	October 9, 2015.
	≥65,000 Btu/h and <135,000 Btu/h	HP	All	EER = 13.0	October 9, 2015.

<sup>1</sup> And manufactured before January 1, 2023.

**Table 4 to §431.97(b)—Updates to the Minimum Heating Efficiency Standards for Air Conditioning and Heating Equipment [Heat Pumps]**

[Not including single package vertical air conditioners and single package vertical heat pumps, packaged terminal air conditioners and packaged terminal heat pumps, computer room air conditioners, variable refrigerant flow multi-split air conditioners and heat pumps, and double-duct air-cooled commercial package air conditioning and heating equipment]

Equipment type	Cooling capacity	Efficiency level <sup>1</sup>	Compliance Date: Equipment manufactured starting on...
Small Commercial Package Air Conditioning and Heating Equipment (Water-Source: Water-to-Air, Water-Loop)	<135,000 Btu/h	COP = 4.3	October 9, 2015.
Small Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	≥65,000 Btu/h and <135,000 Btu/h	COP = 3.3 COP = 3.4	January 1, 2018. <sup>2</sup> January 1, 2023.
Large Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	≥135,000 Btu/h and <240,000 Btu/h	COP = 3.2 COP = 3.3	January 1, 2018. <sup>2</sup> January 1, 2023.

Very Large Commercial Packaged Air Conditioning and Heating Equipment (Air-Cooled)	≥240,000 Btu/h and <760,000 Btu/h	COP = 3.2	January 1, 2018
--	-----------------------------------	-----------	-----------------

<sup>1</sup> For units tested using the relevant AHRI Standards, all COP values must be rated at 47 °F outdoor dry-bulb temperature for air-cooled equipment.

<sup>2</sup> And manufactured before January 1, 2023.

\* \* \* \*

(f) \* \* \*

(1) \* \* \*

**Table 13 to §431.97(f)(1)—Minimum efficiency standards for Variable Refrigerant Flow Multi-Split Air Conditioners and Heat Pumps**

Equipment type	Cooling capacity	Heating type <sup>1</sup>	Efficiency level	Compliance date: Equipment manufactured on and after...
VRF Multi-Split Air Conditioners (Air-Cooled)	≥65,000 Btu/h and <135,000 Btu/h	No Heating or Electric Resistance Heating	11.2 EER	January 1, 2010.
		All Other Types of Heating	11.0 EER	January 1, 2010.
	≥135,000 Btu/h and <240,000 Btu/h	No Heating or Electric Resistance Heating	11.0 EER	January 1, 2010.
		All Other Types of Heating	10.8 EER	January 1, 2010.
	≥240,000 Btu/h and <760,000 Btu/h	No Heating or Electric Resistance Heating	10.0 EER	January 1, 2010.
		All Other Types of Heating	9.8 EER	January 1, 2010.
VRF Multi-Split Heat Pumps (Air-Cooled)	≥65,000 Btu/h and <135,000 Btu/h	No Heating or Electric Resistance Heating	11.0 EER 3.3 COP	January 1, 2010.
		All Other Types of Heating	10.8 EER 3.3 COP	January 1, 2010.
	≥135,000 Btu/h and <240,000 Btu/h	No Heating or Electric Resistance Heating	10.6 EER 3.2 COP	January 1, 2010.
		All Other Types of Heating	10.4 EER 3.2 COP	January 1, 2010.
	≥240,000 Btu/h and <760,000 Btu/h	No Heating or Electric Resistance Heating	9.5 EER 3.2 COP	January 1, 2010.
		All Other Types of Heating	9.3 EER 3.2 COP	January 1, 2010.

VRF Multi-Split Heat Pumps (Water-Source)	<17,000 Btu/h	Without Heat Recovery	12.0 EER 4.2 COP	October 29, 2012. October 29, 2003.
		With Heat Recovery	11.8 EER 4.2 COP	October 29, 2012. October 29, 2003.
	≥17,000 Btu/h and <65,000 Btu/h	All	12.0 EER 4.2 COP	October 29, 2003.
	≥65,000 Btu/h and <135,000 Btu/h	All	12.0 EER 4.2 COP	October 29, 2003.
	≥135,000 Btu/h and <760,000 Btu/h	Without Heat Recovery	10.0 EER 3.9 COP	October 29, 2013.
		With Heat Recovery	9.8 EER 3.9 COP	October 29, 2013.

<sup>1</sup> VRF multi-split heat pumps (air-cooled) with heat recovery fall under the category of “All Other Types of Heating” unless they also have electric resistance heating, in which case it falls under the category for “No Heating or Electric Resistance Heating.”

\* \* \* \* \*

(h) Each air-cooled, three-phase, small commercial package air conditioning and heating equipment with a cooling capacity of less than 65,000 Btu/h and air-cooled, three-phase variable refrigerant flow multi-split air conditioning and heating equipment with a cooling capacity of less than 65,000 Btu/h manufactured on or after the compliance date listed in the corresponding table must meet the applicable minimum energy efficiency standard level(s) set forth in tables 16 and 17 of this paragraph (h).

**Table 16 to §431.97(h)— Minimum Efficiency Standards for Air-Cooled, Three-Phase, Small Commercial Package Air Conditioning and Heating Equipment with a Cooling Capacity of Less Than 65,000 Btu/h and Air-Cooled, Three-Phase, Small Variable Refrigerant Flow Multi-Split Air Conditioning and Heating Equipment with a Cooling Capacity of Less Than 65,000 Btu/h**

Equipment Type	Size Category (Cooling)	Subcategory	Minimum Efficiency	Compliance Date: Equipment manufactured starting on...
Air Conditioners	<65,000 Btu/h	Split-System	13.0 SEER	June 16, 2008. <sup>1</sup>
		Single-Package	14.0 SEER	January 1, 2017. <sup>1</sup>
Heat Pumps	<65,000 Btu/h	Split-System	14.0 SEER 8.2 HSPF	January 1, 2017. <sup>1</sup>
		Single-Package	14.0 SEER 8.0 HSPF	January 1, 2017. <sup>1</sup>
VRF Air Conditioners	<65,000 Btu/h	-	13.0 SEER	June 16, 2008. <sup>1</sup>
VRF Heat Pumps	<65,000 Btu/h	-	13.0 SEER 7.7 HSPF	June 16, 2008. <sup>1</sup>

<sup>1</sup> And manufactured before January 1, 2025. For equipment manufactured on or after January 1, 2025, see Table 17 to paragraph (h) of this section for updated efficiency standards.

**Table 17 to §431.97(h)—Updated Minimum Efficiency Standards for Air-Cooled, Three-Phase, Small Commercial Package Air Conditioning and Heating Equipment with a Cooling Capacity of Less Than 65,000 Btu/h and Air-Cooled, Three-Phase, Small Variable Refrigerant Flow Multi-Split Air Conditioning and Heating Equipment with a Cooling Capacity of Less Than 65,000 Btu/h**

Equipment Type	Size Category (Cooling)	Subcategory	Minimum Efficiency	Compliance Date: Equipment manufactured starting on...
Air Conditioners	< 65,000 Btu/h	Split-System	13.4 SEER2	January 1, 2025.
		Single-Package	13.4 SEER2	January 1, 2025.
Heat Pumps	< 65,000 Btu/h	Split-System	14.3 SEER2 7.5 HSPF2	January 1, 2025.
		Single-Package	13.4 SEER2 6.7 HSPF2	January 1, 2025.
Space-Constrained Air Conditioners	≤ 30,000 Btu/h	Split-System	12.7 SEER2	January 1, 2025.
		Single-Package	13.9 SEER2	January 1, 2025.
Space-Constrained Heat Pumps	≤ 30,000 Btu/h	Split-System	13.9 SEER2 7.0 HSPF2	January 1, 2025.
		Single-Package	13.9 SEER2 6.7 HSPF2	January 1, 2025.
Small-Duct, High-Velocity Air Conditioners	< 65,000 Btu/h	Split-System	13.0 SEER2	January 1, 2025.
Small-Duct, High-Velocity Heat Pumps	< 65,000 Btu/h	Split-System	14.0 SEER2 6.9 HSPF2	January 1, 2025.
VRF Air Conditioners	< 65,000 Btu/h	-	13.4 SEER2	January 1, 2025.
VRF Heat Pumps	< 65,000 Btu/h	-	13.4 SEER2 7.5 HSPF2	January 1, 2025.